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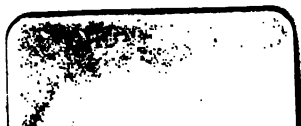




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THE  
**ART OF ENGRAVING,**

WITH THE VARIOUS

**MODES OF OPERATION,**

UNDER THE FOLLOWING DIFFERENT DIVISIONS:

ETCHING.

SOFT-GROUND ETCHING.

LINE ENGRAVING.

CHALK AND STIPPLE.

AQUATINT.

MEZZOTINT.

LITHOGRAPHY.

WOOD ENGRAVING.

MEDALLIC ENGRAVING.

ELECTROGRAPHY.

AND

PHOTOGRAPHY.

*Illustrated with Specimens of the different Styles of Engraving.*

BY T. H. FIELDING,

AUTHOR OF "A SYNOPSIS OF PERSPECTIVE;" "THE PRACTICE OF PAINTING IN OIL AND WATER  
COLOURS;" "THEORY OF PAINTING," &c. &c.

*And Teacher of Painting in Water Colours to the Senior Classes at the Hon. East India Company's  
Military College, Addiscombe.*



LONDON:

PUBLISHED BY ACKERMANN & CO., 96, STRAND.

1841.

1173.

LONDON:  
CHARLES WOOD, PRINTER, POPPIN'S COURT, FLEET STREET.

## PREFACE.

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THE following short treatises on the different modes of engraving now in use, has been arranged with a view of serving the professor as well as the amateur, and we have much reason to hope that neither will be disappointed in turning over these pages, for every care has been used in order to obtain the best information, and to give such information as clearly as the subject would permit.

That the various styles explained in the following work have reached their now high state of perfection through many troublesome and too often uncertain essays can easily be understood, yet the student of the present day has little idea of their magnitude, and how much his predecessors in the art have had to wade through before its various divisions could be presented to his view in their mo-

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WHEN we first commenced the present work, it was our intention to have given a List of the Earliest Etchers and Engravers, their principal works, and their prices, little aware of the difficulties of the undertaking; and it was only after wading through their lives, marked catalogues of sales of their works, and all the various sources of information requisite, that we reluctantly found ourselves obliged to transfer it to a talented dealer in the works of the Old Engravers, hoping that he might be able to accomplish that at which we had laboured in vain: but when we inform our readers, that even *he* was unable to execute the task within the prescribed limits of the present work, we are sure they will readily excuse the omission.

ON THE

INVENTION OF ENGRAVING.

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THE origin of this art is not so well ascertained as the manner of its origin. The Germans claim the invention of engraving on wood, and make it of considerable antiquity. That this mode of engraving preceded the introduction of metal plates is not to be doubted, but the precise time at which either of these methods commenced still remains, and we think must remain, in some degree of obscurity. The French ascribe the invention of engraving on wood to the time of Charles V, when playing-cards were introduced stamped from wooden blocks; but the Germans claim a higher period both for the introduction of engraving on wood and the use of cards, producing specimens of cards stamped from wooden blocks about the year 1300, or earlier, and which a writer on this subject (Huber, p. 89) says, produce an admirable effect in *chiaro-scuro*.

Papillion claims this invention for Italy, imagining it to have originated about the year 1285 at Ravenna. His



treatise upon cutting wood has been republished in the beginning of the fifth volume of Vasari, published at Sienna; but the Abbé Lanzi, in his work on painting in Italy, and to whose labours the world of art is greatly indebted, states, that "it is mixed up with so many assertions to which it is difficult to give credit, that I must decline considering it at all." The Cavalier Tiraboschi is a far more plausible and judicious advocate in favour of Italy (Storia, Lettere, tom. vi, p. 1194). He brings forward a manuscript, by Sandro Dipozzo di Sandro, entitled "Trattato del Governo della Famiglia," written in 1299, and thus quoted by the authors of the Della Cruscan Dictionary, "If you will play for money or at cards you must provide them." From the above it might appear that wooden stamps were used in Italy at an earlier period than elsewhere, had it not been known that the first playing-cards were drawn with a pen and afterwards coloured by the illuminators of missals and others.

The Venetian government issued a decree, in 1441, stating that "the art and trade of cards and printed figures that is carried on at Venice is on the decline, owing to the great increase of playing-cards with coloured figures *stamped*, brought from other countries," and prohibits for the future such importations.

Very soon after the introduction of typographical printing, books were ornamented with prints from wooden blocks, chiefly of a religious character; and in the begin-

ning pasted on to blank spaces purposely left by the typographical compositor. These woodcuts were sufficiently rude in conception as well as execution, were often coloured, and were as frequently used for ornamenting initial letters as alone.

This mode of engraving was greatly improved by Albert Durer and others in Germany, and in Italy by Mecherino de Sienna, Domenico delle Grece, and many others, until Ugo di Carpi introduced a new method of printing from several blocks, each serving for a particular tint of shade, and differing in force, by which he was enabled to copy the designs of Raphael in a manner that induced Vasari to commend this invention as one of the very highest order.

The transition from engraving on wood to something competent to bear a higher degree of finish, as metal plates, would the more readily suggest itself, as the same change had just been made from wooden blocks to metal types for letter-press printing; but Vasari attributes engraving on metal to a different class of artists, the workers in niello, or inlaid modelling work, a very ancient art used for ornamenting every kind of table utensils, household furniture, hilts of swords, silver vessels for sacred and other uses. This art consisted in cutting the required subject or picture in silver, and filling up the incisions with a mixture of silver and lead, which, from its dark colour, was called *nigellum*, abbreviated into niello, producing a regular effect of chiaro-scuro in the work. From

these engravings the artists were in the habit of taking impressions by smoking them, and then, after cleaning the smooth surface with oil, impressing upon the work a damp paper: this was often done with sulphur or fine earth, but the proofs on paper soon became the favourite process, and ultimately led to the invention and use of metal plates, as copper, &c.; and this again was followed by the introduction of the copper-plate printing press; for which, as well as the typographical printing press, we are indebted to the Germans.

Thus it seems tolerably clear, that the art of engraving with the burin, or as it is now called Line Engraving, owes its origin to the workshops of the gold and silversmiths, for many proofs on paper taken from the works in niello are existing in the Italian collections of art, especially in the Durazzo collection and the ancient Gadi gallery at Florence, and as Lanzi says "may be particularly known from the position of the letters, which being written on the models in the ordinary way appear in the impressions from right to left, and in like manner the other parts of the impression are seen in reverse; for example, a principal figure, as a saint, stands to the left, when by his dignity he should have stood to the right; and all the actors write, play, &c., with the left hand instead of the right."

Among the earliest books to be found ornamented with prints taken from metal plates, and which may be esteemed as the most celebrated, are the "Monte di Deo"

and the "Commedia of Dante," both printed at Florence ; also the two editions of Ptolemy's Geography, printed at Rome and Bologna, to which may be added the Geography of Berlinghieri, printed at Florence, all ornamented with prints by artists whose names are not known.

This state of the art was soon altered, and the copper-plate engravers, entirely separating themselves from the goldsmiths and other chasers of metals, opened regular studios, placed their names to their works, took pupils, and became altogether a new body. From this period the art made such rapid improvements that it is impossible for us to trace its further progress within the limits we have prescribed for the present work ; and we shall only add in conclusion a list of the earliest known etchers and engravers on copper-plate, recommending to the amateur a collection of prints of the different epochs, as an amusing comment on the advancement of engraving up to its present high state of perfection.

The Italians commence the art with Mazo Finiguerra, who as well as other Florentines, Lanzi states, had softened their styles about the year 1440. The same may be said of the Italian schools in general ; but he contends that the dryest and coarsest styles must not always have assigned to them the greatest antiquity, or we might fall into the whimsical sophistry of Scalza, who affirmed that the Baronci were the most ancient men in Florence, and in the whole world, because they were the ugliest.

Among the first inventors of this art in Germany, we

find the name of Martin Schöen and his brothers. Schöen was born at Colmar about the year 1455, and died there in 1499; but still earlier engravers are adduced on the part of Germany, one with the initials C. E. and the date 1465, and two others, mentioned by Bar. Herneken, dated 1466. He dates the discovery to have taken place in Germany about the year 1440.





*Etching.*







## ETCHING.

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THE exact date of the invention of etching is extremely uncertain. It is also uncertain whether we owe it to the Italians or the Germans, though the writer of the article "Etching," in Dr. Rees's Encyclopædia, very justly remarks that the word itself, originally *etzen*, is not Italian, but German, and that it is very unlikely that an Italian invention should have received a German name. Be it as it may, Albert Durer, a German, and Agostino Veneziano, and Parmegiano, Italians, were contemporary, and the earliest artists known to have practised the art.

In the following instructions we shall consider etching, not as the beginning of line engraving, or as practised by line engravers, but as generally executed by painters. In this style the needle and aquafortis are the only means employed, the graver being seldom called into action, and the parallel ruler for ruling flat tints, *never*. Prints from plates done in this manner are generally termed painters' etchings, to distinguish them from those made by the line engraver; and as their worth is derived from the skill in drawing possessed by the person who etches them,

so every attempt to imitate the engraver's beautiful, but more or less mechanical arrangement of lines, will only deprive the artist of that facility of drawing and freedom of execution, by which his works ought to be distinguished.

The process of etching consists in covering a metal plate with a varnish called etching-ground, through which the lines composing the subject are drawn with a sharp-pointed etching needle, cutting through the varnish into the surface of the plate; these lines are afterwards corroded with an acid till of a sufficient depth: but before we proceed to the details of the process, we shall enumerate and describe the various objects which may be wanted, and which are as follow:—

**ETCHING-GROUND.** This is to be had at all the shops where they sell engraving materials; but for those who wish to make it themselves, the following recipe of Mr. Lowry, the celebrated engraver, will be found one of the best. “To two ounces of asphaltum add one of Burgundy pitch, and an ounce and a half of white virgin wax. The asphaltum must be finely powdered, and then melted in a glazed earthen vessel over a moderate fire, before the Burgundy pitch is put in; the wax must be added last, when the whole composition must be well stirred, and then poured into warm water, to be further incorporated by means of the hands, and made up into balls.” When used, a ball ought to be tied up in a piece of stout silk cloth.

**TRANSPARENT ETCHING-GROUND** may be made by putting one ounce of common resin and two ounces of virgin wax into a glazed pipkin; set it over a gentle fire until it simmers, and when cool is fit for use, and is laid in the same way as the common etching-ground, except that instead of being smoked it must be warmed with a piece of writing-paper after being dabbed. A very good transparent etching-ground may be made by covering the plate with thin turpentine varnish, in which a small quantity of oxyde of bismuth has been mixed; this should be laid on very evenly with a camel's hair brush, and has the property of showing the original etching in the plate, over which it is laid, much better than the former transparent ground, as it is less dazzling. Great care, however, is requisite to have the right quantity of oxyde; if too much, the work over which it is laid will scarcely be visible; if too little, the ground becomes dazzling. After it has been laid a day or two on the plate, this ground is apt to become brittle, which may be remedied by warming it gently at the fire, or heating the plate a little. Oxyde of bismuth is sold at most chemists, and should be impalpable.

**TURPENTINE VARNISH** may be bought at all the colour shops, or may be made by putting common resin into a bottle of spirits of turpentine, and then setting the bottle in an oven, or near the fire, till the resin is quite melted.

**STREET'S BRUNSWICK BLACK** used for stopping out or

covering any lines that are not correctly etched, may also be bought at all the oil and colour shops. If not to be had, a piece of etching-ground, dissolved in spirits of turpentine, will answer the same purpose.

BORDERING WAX is made by melting over a slow fire in a glazed pot, three pounds of Burgundy pitch, one pound of bees-wax, to which is added, when melted, a gill of sweet oil. When it has been melted a little time take it off to cool; then pour it into water, and afterwards pull it well to make the ingredients unite more intimately. It may be bought at all shops, which sell engraving materials.

A HAND-VICE, not less than five inches in length, will be wanted to hold the plate while heating it.

ETCHING NEEDLES (Plate I, fig. 1) should be three or four different degrees of fineness. To sharpen them well requires some degree of manual dexterity and practice. First, grind the point on a flat Turkey stone, or hone, turning the needle round in your fingers while rubbing it on the stone; next, take the handle of your needle between the palms of your hands, and placing the point in a groove on the hone, turn it rapidly round by rubbing your hands against each other, backwards and forwards, in different directions; then rub them on a strap, prepared with washed flour of emery and tallow, to take off any roughness and make them perfectly round. When used for *dry-pointing*, the etching needle should only be sharpened on the flat hone, so as to procure an angle on

one side of the point, to cut with, and ought not to be strapped.

THE GRAVERS (Plate I, fig. 5) should be of different forms, from the extreme lozenge to the square, the lozenge being for fine, and the square for broad lines. To sharpen the belly, or sharp edge of the graver, requires great nicety. Lay one of the flat sides of the graver on the oilstone, keeping the right arm close to the side, and the fore-finger of the left hand pressed upon that side of the graver which is uppermost; next, sharpen the other side the same way. The face or point is sharpened by holding it firm in your hand, with the belly upwards, in a slanting position; then rub it backwards and forwards on the stone, taking care to carry it evenly along, and not to make more than one face on the point; this being done, hold the graver a little more perpendicular to square the point, which will be done in a very short time, as it should not be squared too much.

THE SCRAPER (Plate I, fig. 2) should be three-sided, and fluted, as they are easier to sharpen: it is used to take off the burr left by the etching needle or dry-point.

THE BURNISHER (Plate I, fig. 3) is used to soften lines which have been bit too dark. We recommend the kind used by mezzotint engravers, as being the best form for all kinds of neat and delicate work (Plate I, fig. 4).

THE OIL-RUBBER should be made of woollen cloth, rolled up as tight as possible, and tied round with string; one, six or seven inches long and two inches or two inches

and a half in diameter, is sufficiently large for almost all purposes. Where a small one is wanted, a piece of cloth laid over your fore-finger, may be advantageously used, or a piece of very soft cork will do. The oil-rubber is used with oil alone, or with oil and

WASHED FLOUR OF EMERY, which is emery in a state of impalpable powder, and of the greatest use in rubbing down parts that are too dark, as is also

EMERY PAPER, not such as is used by servants to clean iron utensils, but such as is made with washed flour of emery, and like it only to be had, I believe, at some of the great ironmongers, or at some of the coppersmiths. When washed flour of emery is not to be had, crocus martis may be used, but is not so good.

CHARCOAL is also used, with either oil or water, in rubbing down dark parts, or taking out blemishes in copper plates: to be procured best at your coppersmith's, who will give you the kind you want.

A CAMEL'S HAIR BRUSH with very long hair will be wanted, to sweep off loose varnish while etching; some small ones for stopping out, and larger ones for laying on transparent ground, and varnishing broad parts of the plate.

THE DABBER (Plate I, fig. 14) to lay the etching ground even, is made by tying up cotton wool very tight in a piece of silk, which should be as even as possible, without any threads larger than the rest. We recommend fine wool instead of cotton wool; and if it is laid very thick on

a round piece of card-board, three inches in diameter, and a double silk stretched over it and tied behind, so as to make a soft elastic even cushion, well raised in the middle, it will be found more convenient to handle than the common dabber.

THE BRIDGE, or REST, is a thin board planed smooth, with the edges sloped off, and of a length and breadth proportioned to the size of the plate you are working upon. At each end is fastened a piece of wood sufficiently high to raise it above the plate when the wall of wax is on. There should also be another, much lower, to be used in etching, before the wall is made.

THE BLIND, or SHADE, is made of tissue paper, stretched upon a frame, and placed between your work and the light, to enable you to see better on the surface of the bright copper. A very convenient one is made in the following manner—take a heavy piece of wood about fifteen inches long, three inches broad, and one inch thick; then take about one yard of stiff wire, and place the ends of it in each end of the wood, so as to form an arch, over which stretch tissue paper, and you may bend the wire so as to throw the light in any direction you may require.

Besides the above-mentioned objects, it is necessary to have a Turkey stone, or hone, a couple of glass bottles with glass stoppers, one of them with a small mouth capable of holding a pound of pure nitrous acid, the other with a wide mouth and capable of containing a



pint or more, according to the size of the work which will have to be covered, of diluted nitrous acid. When bottles with glass stoppers are not to be procured, a common bottle with a *wax stopper* will do for the pure nitrous acid, which it is better to reduce in strength, by adding exactly the same quantity of water, to prevent its destroying the wax stopper, which it soon would, if left the full strength: the wide mouthed bottle may be advantageously replaced by a pint pitcher, on which a piece of wood may be laid, that the strength may not evaporate. Should architecture form the subject of the plate to be etched, a tee-square, and brass edged parallel ruler will be wanted. A pair of steel screw compasses will also be useful for etching arches.

Copper or steel plates are, or ought to be, sufficiently well polished when brought home from the coppersmith's, to admit of having the etching-ground laid upon them without any further preparation; but the former being a softer metal, is extremely liable to get scratched, or the polish destroyed. When this is the case the scratches ought to be burnished, and the burnisher's marks taken out by oil rubbing the plate with washed flour of emery and sweet oil; when the scratches are too deep to be effaced with the burnisher, they may be taken out with the scraper, which must be used very lightly, so as not to scratch; the scraper marks must then be taken out by rubbing the place either with charcoal and oil, or a piece of cloth on the finger with emery and oil. *It may be as well to re-*

*mark here, that whenever the word emery is used in this work, washed flour of emery is to be understood.*

Sometimes, however, it happens that the scratch is too deep, or a line or point *bit in* so strongly as not to admit of being effaced either by the burnisher or the scraper. In this case recourse must be had to the process of *knocking up*, an operation requiring great nicety and dexterity, and which we shall briefly describe.

The instruments required are—a polished steel anvil, a hammer (Plate I, fig. 13) having a head, with one end flat and the other with a rounded point, and a pair of calliper compasses. These last are easily made out of a pair of iron compasses, such as are used by carpenters and coopers, by heating the points, and then bending a quarter of an inch of each inwards, so that they shall exactly meet, leaving a space of half an inch between the two legs (Plate I, fig. 16). By placing the plate between the legs of the compasses, with one of the points on the spot to be effaced, you can easily mark on the back with the other point the place immediately opposite to it. The plate is then placed with the part to be effaced on the anvil, and struck at the back with the round end of the hammer, till the line or hole is filled up. The jarring of the plate in the hand, and the noise of the hammer, will sufficiently indicate when the part of the surface immediately opposite to where you strike is fairly on the anvil or not. Before, however, you proceed to the actual hammering, the work on the part to be effaced

must be carefully taken out with an instrument called a scooper (Plate I, fig. 6), so as to leave a clean smooth hollow.

When the part to be effaced is very minute, an iron punch is used, and the plate must then be held on the anvil by an assistant, whilst you hold the punch steadily with the left hand, on the spot marked at the back with the compasses, and strike it gently, but smartly, with the hammer, till the place is filled up.

However neatly the operation of knocking up is performed, the lines of the etching in the immediate vicinity of the part knocked up will be more or less weakened or effaced, and will want re-etching with a transparent ground, or working up to their original strength with the graver. It often happens, also, that the part effaced is raised above the level of the plate, in which case, it must be brought down with the scraper, and afterwards finished with the charcoal.

When a new plate has been oil rubbed, the oil is first wiped off with a rag, it is then washed with spirits of turpentine, and after that is wiped off, is cleaned and polished with a dry rag and whiting; it is then ready for an etching-ground, which is laid in the following manner —

Fasten the plate in the hand-vice, and hold it with the surface upwards over a charcoal fire, or heat it with pieces of paper, till so hot that you cannot bear your finger on it; then rub the etching-ground, wrapped up in a piece of silk, backwards and forwards, till the plate is

covered as evenly as you can with the ground, which, melting with the heat, oozes through the silk. Next, with the dabber, dab the plate gently all over till it appears of the same colour, as it is darkest on those places where there is most etching-ground, and continue the dabbing till the plate *begins* to cool, and no longer. Then, whilst the ground is yet warm, take a candle, or what is still better, a wax taper twisted together, so that six or more flames unite in one, and cutting the wicks short hold them under the plate turned with the ground downwards, and keep the flame moving backwards and forwards till every part of the ground is of a shining black colour. The greatest care must be taken never to let the flame remain a moment in the same place, as the ground would burn, which is easily seen by its becoming dull and cracked. When cold, the plate is ready for the reception of the design.

As a subject is seldom etched upon a plate at once, without having previously made a picture, or at least an outline on paper, we must now describe the various methods of reducing, tracing, and transferring the tracing on to the plate.

When the picture is larger than the plate on which you intend to copy it, take a pair of compasses and divide the top and bottom into an equal number of parts, marking each part on the edge of the picture with a pencil or chalk; then with the compasses in the same position measure off along the sides of the picture, beginning at

the bottom, as many parts as the sides will contain, so that the remainder or fraction of a square, if any, may be at the top; for it seldom happens that the same measure, which equally divides the top and bottom of a picture, will also equally divide the sides, and it is better that the picture be marked out into perfect squares, leaving only a line of imperfect squares along the top, than as usually recommended, by dividing the sides equally as well as the top and bottom, cut the picture into a set of long squares. You can now, if an oil painting, draw lines either with a black water colour, which is easily cleaned-off afterwards by a sponge, if the picture be light, or white water colour, if dark: or if the subject be a painting in water colours, wrap round it threads from top to bottom, and from side to side; take a piece of smooth writing paper the size of the intended subject (which must always be so much less than the plate, as to leave at least half an inch or more of margin all round) and divide it with a pen and a pale tint of lake or vermillion into exactly the same number of squares as the picture; then with an F, HB, or B pencil, copy whatever is in each square of the picture into the corresponding square on your paper, and to prevent mistakes number the squares both on the painting and the paper. This being done, damp the paper well, fix it with the face downwards on the etching-ground with wax at one side, and let the printer pass it through a moderately tight rolling-press, by which means the pencil marks will be

transferred to the ground, so that the subject will appear *reversed*, in fine silvery lines.

When the subject you mean to copy is to be the same size on the plate, take a piece of thick transparent tracing paper, and fastening it firmly to the painting by turning a part of it over the top and pasting it behind, trace the outline with a blacklead pencil, and then transfer it to the ground as directed above. To make tracing paper, mix together equal parts of spirits of turpentine and drying oil, and with a rag or piece of cotton wool rub it evenly over a sheet of tissue paper, which must be hung to dry for a day or two. *Thick* tracing paper may be made with very smooth thin writing paper.

When no rolling-press is to be had, another method must be pursued to transfer the outline to the etching-ground. Having made the tracing or reduction on *thin* transparent paper, take a piece of the thinnest and smoothest foreign letter paper, or what is still better, a piece of glazed tissue paper, and rub it evenly over with vermilion, chrome yellow, white lead, or any other light colour in impalpable powder till well covered. Then having turned down the tracing on to the plate, and fastened it with wax at the top edge, place the vermilion paper between it and the ground with the colour side downwards, and with a blunt-pointed etching needle, called a tracing point, go over the outline using a moderate pressure, by which means it will be transferred in colour to the etching-ground. A still quicker method is often used,

but which requires the greatest delicacy as well as firmness of touch, and a tracing point perfectly rounded so as not to cut the paper and so injure the ground, is to rub the front of the tracing itself with vermillion, and lay it on the plate so as to do away with the necessity of an intermediate coloured paper.

The bridge being placed over it, the plate is now ready for the commencement of the etching, and but few instructions are requisite to enable the painter to proceed without difficulty. The etching needles with the most tapering points should be used for the skies and distance, pressing more heavily, and changing them for others as we approach the foreground, sharpened, with a thicker point made by holding it more perpendicularly on the stone, so as to give a broader and deeper line. Wherever the ruler is used for buildings, ship-masts, &c., it is to be remembered that the lines made with it will be much darker than those made by the hand, so that a much less pressure is required; and it should be the endeavour of every one, who wishes to give a pleasing effect to his work, to etch with an equal pressure, so as to produce lines of the same strength wherever a flat tint is wanted, as in the shade side of a house, a mass of distant trees, &c. It is of course needless to mention that the closer the lines are laid together the darker will be the part so etched, and where extreme depth is wanted it is usual to cross the lines; this, however, looks better when the lines that cross the others are done with a second transparent

ground. Wherever any error has been made the part must be covered evenly, and not too thickly, with a camel's hair pencil dipped in Brunswick black, and when dry the lines re-etched *through* it. We must here remark that the etching must always penetrate so well *through* the etching-ground as to scratch the metal; and when the plate is steel, it is better, as much as possible, to avoid breathing upon it, as the slightest humidity will often rust it. Steel plates, when no longer wanted by the printer, ought to be well cleaned, and then covered with white wax by heating them, and then passing the wax over them.

Though the shade sides of white objects may generally be etched and bit in with aquafortis, it is better to do them with the dry point, which is peculiarly well adapted for the fur and hair of white animals, the light of white drapery, light clouds and sky, and extreme distances.

It is difficult, nor is it indeed the province of this work, to give further directions to the painter as to the manner of his work. It depends entirely on his skill in drawing, and his facility in using the pen or pencil; on his taste in the choice of his subject, and his knowledge of general or particular effects in the arrangement of forms, and the disposition of lights, shades, &c.

The etching being finished, the plate must be carefully examined, and all accidental scratches stopped out with Brunswick black. When this is dry, a wall or border is put round the plate, which is done by softening the bor-



dering wax in warm water till perfectly ductile; it is then pulled out into straps about six inches long, one inch broad, and a quarter of an inch thick, and the edge pressed down immediately before it cools on the margin, and the thumb of the left hand passed along the inner edge with a strong pressure so as to squeeze the wax close down to the plate: another piece is to be immediately joined to the first, and so on till the plate is surrounded, leaving a spout at one corner to pour off the acid.

It is difficult to give exact rules for *biting in*, but the following will be found sufficient. Procure some strong nitrous acid, and such is sold by Mr. Sellers the Chemist, in Broad Street, St. Giles's, at a shilling the pound\*, and then mix, in a wide-mouthed bottle, one part of the acid with five parts of water, adding to it a small portion of sal ammoniac, in the proportion of the size of a hazel nut, to one pint of acid, when mixed for *biting*†. The advantage of using the sal ammoniac is, that it has the peculiar property of causing the aquafortis to bite more directly downwards, and less laterally, by which means lines laid very close together are less liable to run into

\* We mention Mr. Seller's name with pleasure, as it has been the fashion to sell this acid at a much higher price.

† We should have earlier observed that *biting* or *biting in*, is the technical term for eroding the copper that has been laid bare by the etching needle.

each other, nor does the ground so readily break up, by thus preventing the natural tendency to lateral erosion. Pour the mixture, *when cool* (nitrous acid becoming warm when mixed with water), on to the plate, and leave it to bite in the delicate parts about a quarter of an hour, sweeping off the bubbles as they form on the plate with an old camel's hair brush or feather; take off the acid, wash the plate with water, and dry it either by blowing with bellows, or pressing on it gently with a piece of blotting paper; stop out with Brunswick black those parts which are sufficiently bit in; again put on the acid, let it remain twenty minutes or half an hour, to give the next degree of depth; wash and stop out as before, and leave the acid on for half or three quarters of an hour for the last biting, as three bites are generally sufficient for most painters' etching.

The wall is now to be taken off by warming the margin of the plate at the back with a piece of lighted paper; it is then to be washed clean with spirits of turpentine, then oil rubbed, then again washed with spirits, and after being wiped dry may be taken to the printer's for a proof.

The process of biting in, described above, is only applicable to copper plates: for steel plates another method is pursued, which is as follows:—

Mix together

|                             |          |
|-----------------------------|----------|
| Pyroligneous acid . . . . . | 1 part.  |
| Nitric acid . . . . .       | 1 part.  |
| Water . . . . .             | 6 parts. |

In *biting in* with this composition the first tint will be only on and off, washing the plate immediately with water, and never using the same water twice; when washed, the plate must be set on one edge, and blown dry with bellows as soon as possible to prevent rusting.

If pyroligneous acid is not to be had, from sixty to seventy drops of nitric acid to one pint of water will do nearly as well.

In *biting in* steel, one minute will be generally found long enough for the darkest tint.

If, on examining the proof, all or part of the etching is found too weak, it may be made stronger either by etching over it with a transparent ground, or, when the tint is not too delicate, by *rebiting*, in which case a *rebiting* ground must be laid, and which is performed in the following manner.

Clean the plate well with spirits of turpentine, then wash it with pure water of potass, which is to be had at the chemists; next rinse the plate with perfectly clean water several times, till entirely free from the potass, and wipe it quite dry with a clean rag. This being done, heat a spare piece of copper or steel plate, on which melt some etching-ground, then with a silk dabber (a new one is best) take up a small quantity, and having previously heated the plate which is to be *rebit*, dab it very lightly all over, and continue till every part of the surface is well covered with the ground, leaving the lines perfectly clear. This is an operation which requires great patience and the utmost delicacy of touch, and as it takes consi-

derable time, the plate must be heated very often to keep up the same degree of warmth, which is extremely difficult. For this reason it is better to employ the following method, which is now generally used by most engravers not only for rebiting, but also for common etching-grounds. Procure a tin box twelve inches long, nine broad, and three deep, without any opening except a hole at one corner, by which it is to be filled with hot water. This is placed on a stand so as to admit of a small charcoal stove underneath, by which the water must always be kept at a boiling heat. The plate is laid on this box, and by this means kept at an uniform temperature, so that there is no danger of burning the ground, which so often happens when the plate is heated in the common way. When the ground is cold, a wall may be put round it, and the subject bit in as before.

Should it be intended to *re-etch* the plate, a transparent ground must be laid, the manner of doing which we have already described under the head of TRANSPARENT GROUND.

A well-practised etcher, after each biting in, takes off a very small portion of the ground, and can then judge in what manner it will print. He then stops out, or passes over all the lines which may be sufficiently deep, with Brunswick black, and proceeds with the rest as we have already mentioned.

When any line or small part is too dark, it may be made lighter with the burnisher; but when any broad

tint or the whole of the plate is too dark, the quickest way is to rub it down with the emery paper before mentioned. This, however, should be well rubbed on a piece of copper or steel, to take off the sharpness which might otherwise scratch, and even then it will leave a mark, which would show strongly in the proof if not first taken out with soft charcoal and oil, and then polished with the oil rubber.

A pleasing way of giving more effect to an etching, when finished, is to take off the polish of the plate with the emery paper, by which means a delicate tint is laid all over it, and on which the lights on clouds, white figures, water, &c., may be burnished. Pumice stone finely powdered and sifted through muslin, and rubbed on with a rag will do the same; and Rembrandt often, by leaving the surface of the plate only partially cleaned from the printing ink, when proving, produced a singular effect on some of his etchings.

When etching or engraving by lamp light, we recommend the use of a globe of water, placed between the lamp and the plate, as described under the head of Wood Engraving.

We shall conclude with a short account of ETCHING ON GLASS, a process which, we are afraid, is more curious than useful. The glass employed should be a piece of the best plate, which must be covered with a mixture of lamp black and turpentine varnish. When dry, the subject is etched in the same way as on copper; and as





*Soft-ground Etching.*

soon as finished a wall is put round, and fluoric acid poured over the glass, on which it will require to be left five or six hours exposed to the sun before the work is sufficiently corroded. In winter the glass is but slightly acted upon in four days, and would never be finished, if not placed in a very hot room.

### SOFT GROUND ETCHING.

Etching on soft ground is a style of engraving formerly much employed to imitate chalk or pencil drawings. Since the invention of lithography, however, it has been almost entirely abandoned, though for those who live too far from any town, where a lithographic press is established, it will be found a great source of amusement, as the rapidity and facility with which it is executed, will often tempt those who have not sufficient patience to pursue the more tedious operation of etching on hard ground.

Soft ground for winter use is made by adding one part of hog's lard, to three parts of common etching-ground; but for warm weather, less hog's lard is required. The ground is laid and smoked in the same way as the hard etching-ground, taking care that nothing touches it after it is done, till the paper is laid on.

The process is as follows. Draw the outline of your subject faintly on a piece of smooth thin writing paper, which must be at least an inch larger every way than the plate;



then damp it, and spread it cautiously on the ground, and turning the edges over, paste them down to the back of the plate: in a few hours the paper will be dry, and stretched quite smooth. Resting your hand on the bridge take an H or HB pencil, and draw your subject on the paper exactly as you wish it to be, pressing strongly for the darker touches, and more lightly for the more delicate parts, and according as you find the ground more or less soft, which depends on the heat of the weather, or the room you work in, use a softer or harder pencil, remembering always that the softer the ground the softer the pencil. When the drawing is finished lift up the paper carefully from the plate, and wherever you have touched with the pencil the ground will stick to the paper, leaving the copper more or less exposed. A wall is then put round the margin, the plate bit in, and if too feeble, rebit in the same way as a common etching, using *hard etching-ground* for the rebite. If the acid has been successfully applied to the plate the proof will be exactly the same as the drawing made by the soft etching-ground sticking to the underside of the paper, which is indeed itself a proof how far you have succeeded.

The specimen we have given of soft ground has a tint of aquatint thrown over it, except on the lights; and we may here observe, that an outline in soft ground, for aquatint is much less apt to cause white lines than the continuous line of common etching.









## LINE ENGRAVING.

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OF all the various kinds of engraving, the art we are about to describe stands pre-eminently the first. However it may be surpassed by other branches of the profession in the representation of certain objects, yet as a whole it is decidedly superior to the rest. It cannot produce the velvety softness, intense depth, and harmonious mingling of light and shade, which is given by mezzotint. Neither can it, even when aided by the ruling machine, produce that silvery clearness, or deep transparent tone perceived in aquatint; nor like it, reproduce the *dragging*, *scumbling*, and accidental touches of the artist's brush. In crispness and brilliancy it is far exceeded by wood engraving. Still it stands before all others, and we cannot but see with regret, though not surprise, its present declining state.

When steel was first applied to line engraving, the immense number of impressions it was found capable of producing, enabled the publishers to offer to the world, works beautifully illustrated, at a much cheaper rate than had hitherto been done. A new class of pub-

lications, we mean the annuals, were introduced as a vehicle for spreading more rapidly the impressions from steel plates, and the most beautiful productions of our best engravers were flung with a prodigal hand before the public, at a price for which they ought never to have been sold, and which only an excessive sale could render profitable. We are no enemies to cheapness in any thing, and still less in whatever may contribute to the mental enjoyment of the public, but when that cheapness is obtained by the reduced income of the artist, reduced, not from extravagant gains to fair remuneration, but from fair remuneration to insufficiency; when such is the case we cannot but lament, whilst we admire the beautiful works which fill our portfolio, the sacrifice by which they have been so cheaply obtained.

The cause of this deterioration was simply the excessive sale of these illustrated works, which created a demand for line engravers far beyond what the population of England, rich as she is, ought to support. But the fashion for annuals, like all other fashions, passed away. One by one they sunk into oblivion, and left the artists they had helped to create, to seek an existence in other countries, or by attempting some other branch of the profession. The public, weary with seeing in every shop and on every table the beautiful engravings which steel plates had showered upon the land, like a child surfeited with sweets, was glad to turn to something else, and mezzotint became the fashion. Then it was that the

reduced sale of illustrated works, no longer allowed the publishers to offer a fair remuneration, and the quantity of engravers unemployed were forced to accept the little they could afford to give.

Such are the causes of the present depressed state of the art, and were these all the evils arising from engraving on steel, if it were merely a stagnation arising from too great a production, however much we might regret the losses which line engravers must for a while sustain, still we know that a few years must bring back the art to a more healthy state. But when the hardness of the metal was found to admit of finer work, then came in fashion the excessively finished style of the present day, which, whilst it increases the mechanical difficulties, tends to reduce all engravers to the same level, or what is still worse, allows some whose only merit consists in a capability of laying lines closer than others, to usurp the place of real talent. This is indeed an evil, and we are afraid that many years must pass away before the vitiated taste of the public can bear the works of real genius, unfettered by the microscopic finish of the present style.

The process of line engraving consists at present, in first etching the plate, and then after it is bitten in, finishing it with the graver and dry point. Formerly, however, it was the custom to begin and finish a plate with the graver only; but this method has long been laid aside,



as the use of the etching needle gives so much greater freedom in the representation of almost every object.

Of the method of laying the ground, transferring the subject to the plate by means of tracing, and of sharpening the graver, needle, &c., we have already spoken under the head of etching. The manner of handling the needle is, however, very different, as in all the flat tints a ruler is made use of. Clear blue skies are done by means of the ruling machine, of which the following is a description. "On a straight bar of steel is placed a socket, which slides backwards and forwards with a steady, but even motion. To the side of the socket is fitted a perpendicular tube, which receives a steel wire or any other hard substance, called a pen. This pen has a point like an etching needle, and is pressed down by the action of a spring. If, then, a copper plate covered with the etching-ground is placed under the ruler, which should be supported at each end, and raised about an inch above it, the point of the pen may be caused to reach it; and if the socket to which the pen is attached be drawn along the bar, it will form a straight line upon the plate, more even, but in other respects the same as if that line had been drawn by hand with a ruler. Now, if the plate or the ruler be moved, backwards or forwards, in a direction parallel to this first line, any number of lines may be drawn in the same manner."

In the machine, therefore, a very exact screw, acting

upon a box confined by a slide and connected with the bar or board upon which the plate rests, produces the requisite motion ; and a contrivance or index is used to measure the exact portion of a turn required before any stroke is drawn. Such is the principle of the machine most generally used ; but the point or pen employed should not be made of steel, which however well tempered will require frequent sharpening, and must therefore inevitably draw strokes deficient in perfect uniformity. The pen should have a diamond point, which when once properly figured remains constantly the same, and imparts an admirable degree of regularity and sweetness to the work.

Though the ruler is used in laying flat tints, it does not follow that the lines made with it are to be straight ; on the contrary, they are made to take the form most suited to the object by slightly moving the hand, taking care to make them parallel. But the greatest difficulty, and what requires the longest practice to attain, is to give that equal pressure to the needle, so that every line may be the same depth, width, and distance from each other, without which it is entirely hopeless to obtain an even tint. This capability of laying flat tints, and of ruling parallel lines excessively close without running into each other, is so essential, that no one can expect to make a decent plate till he has fully accomplished it ; and the first business of the learner should be by continual practice to obtain a readiness

and certainty in the management of the ruler and needle. He must also be equally capable of laying parallel lines of the same strength without the aid of the ruler, and must seek to acquire a freedom of handling in etching grass and the foliage of trees in landscape, and the flowing lines required in drapery and the waves of the sea.

In etching a plate to be finished as a line engraving, every part which is white, such as white drapery, satin, light water, ice, white clouds, the white fur of animals except when in shade, and the light parts of flesh; &c., ought to be left untouched by the aquafortis, and laid in with the dry-point or graver.

The following extracts from a celebrated work on Engraving, aided by the examination of the prints of the best professors of the art, will be found worthy of attention. "The strokes of the graver should never be crossed too much in the lozenge manner, particularly in the representation of flesh, because sharp angles produce the unpleasing effect of lattice work, and take from the eye the repose which is agreeable to it in all kinds of picturesque designs; we should except the case of clouds, tempests, waves of the sea, the skins of hairy animals, or the leaves of trees, where this method of crossing may be admitted. But in avoiding the lozenge it is not proper to get entirely into the square, which would give too much of the hardness of stone. In conducting the strokes, the action of the figures and of all their parts should be considered, and it should be ob-

served how they advance towards, or recede from the eye, and the graver should be guided according to the risings or cavities of the muscles or folds, making the strokes wider and fainter in the lights, and closer and firmer in the shades. Thus the figures will not appear jagged, and the hand should be lightened in such a manner, that the outlines may be formed and terminated without being cut too hard ; however, though the strokes break off where the muscle begins, yet they ought always to have a certain connection with each other, so that the first stroke may often serve by its return to make the second, which will show the freedom of the engraver.

In engraving the flesh, the effect may be produced, in the lighter parts and middle tints, by long pecks of the graver, rather than by light lines or by round dots, or by dots a little lengthened by the graver, or, best of all, by a judicious mixture of these together.

In engraving the hair and the beard, the engraver should begin his work by laying the principal grounds and sketching the chief shades in a careless manner, or with a few strokes, and he may finish it at leisure with finer and thinner strokes at the extremities. When architecture is to be represented, except it be old and ruinous buildings, the work ought not to be made very black, because as edifices are commonly constructed either of stone or white marble, the colour being reflected on all sides does not produce dark shades as in other substances. When sculpture is to be represented, white

points must not be put in the pupils of the eyes of figures as in engravings after paintings, nor must the hair or beard be represented as in nature, which makes the locks appear flowing in the air, because in sculpture there can be no such appearance.

In engraving cloths of different kinds, linen should be done with finer and closer lines than other sorts, and be executed with single strokes. Woollen cloth should be engraved wide in proportion to the coarseness or fineness of the stuff, and when the strokes are crossed, the second should be smaller than the first, and the third than the second. Shining stuffs, which are generally of silk or satin, and which produce flat and broken folds, should be engraved more hard and more straight than others, with one or two strokes as their colours are bright or otherwise; and between the first course of lines other smaller must be occasionally introduced, which is called interlining. Velvet and plush are expressed in the same manner, and should always be interlined. Metals, as armour, &c., are also represented by interlining, or by clear single strokes. In architecture, the strokes which form the rounding of objects should tend to the point of sight, and when whole columns occur, it is proper to produce the effect as much as possible by perpendicular strokes. If a cross stroke is put, it should be at right angles, and wider and thinner than the first stroke. The strokes ought to be frequently discontinued and broken for sharp and craggy objects.

Objects that are distant, towards the horizon should be kept very tender. Waters that are calm and still, are best represented by strokes that are straight and parallel to the horizon, interlined with those that are finer, omitting such places as in consequence of gleams of light exhibit the shining appearance of water; and the forms of objects reflected upon the water at a small distance from it, or on the banks of the water, are expressed by the same strokes retouched more strongly or faintly as occasion may require, and even by some that are perpendicular. For agitated waters, as the waves of the sea, the first strokes should follow the figure of the waves, and may be interlined, and the cross strokes ought to be very lozenge. In cascades, the strokes should follow the fall and be interlined. In engraving clouds, the graver or needle should sport where they appear thick and agitated, in turning every way according to their form and their agitation. If the clouds are dark so that two strokes are necessary, they should be crossed more lozenge than the figures, and the second strokes should be rather wider than the first. The flat clouds that are lost insensibly in the clear sky should be made by strokes parallel to the horizon, and a little waving; if second strokes are required, they should be more or less lozenge, and when they are brought to the extremity the hand should be so lightened that they may form no outline. The flat and clear sky is represented by parallel and straight strokes, without the least turning.

In landscapes, the trees, rocks, earth, herbage, and indeed every part except white objects, should be etched as much as possible; nothing should be left for the graver, but perfecting, softening, and strengthening."

The above observations will be found very useful to refer to, though perhaps after all, the examination of the prints of the best engravers will be found the best instruction that the beginner can have; but then that examination ought to be, not merely to see how certain work is performed, but the manner of executing the representation of the same object by different engravers should be carefully observed, and that which is best selected as a model, remarking at the same time wherein consists its excellence, and in what manner it differs from the rest.







Aquatinta.





## AQUATINT ENGRAVING.

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THIS art, so beautiful yet so difficult, so peculiarly adapted to those subjects requiring broad flat tints of extreme delicacy or excessive depth, so capable of expressing light foliage on a dark back ground, and the only style of engraving which can faithfully render the touches of the artist's brush, has of late years been degraded to the mere production of coloured prints, though there is no one who has seen the spirited engravings done in the latter end of the last century by Madame Prestel, after Rosa da Tivoli, or in the present day the beautiful productions of Reeves and others, after Copley Fielding, Vicars, &c. &c., but must acknowledge that it deserves a higher station than at present it seems to hold.

Engraving in aquatinta is said to have been invented by a French artist of the name of ST. NON, who communicated it to JEAN BAPTISTE LE PRINCE, a painter and engraver who died in 1783. PAUL SANDBY introduced it into England and greatly improved it, and Madame CATHERINE PRESTEL, a German, produced works which even at the present day cannot but be admired.

The process of aquatint engraving, as now followed, consists in pouring over a highly polished copper-plate, a liquid composed of a resinous gum dissolved in spirits of wine, which latter evaporating leaves the resin spread all over the plate in minute grains that resist the action of the aquafortis, which however corrodes the bare surface of the copper that is left between them. This granulated varnish is called a *ground*; but before the invention of this process, *dust grounds* were made use of, though they are no longer used in England. The method of making them is as follows:—Powder some common black resin very finely, and tie it up in a muslin bag; then having rubbed the plate very slightly with a greasy rag so as just to dim the copper, shake the bag over it till it is completely covered with the powder; strike the plate smartly at the back to shake off any loose particles, and fix the resin which remains on it by warming it at the back with a piece of lighted paper till it begins to change colour.

To make liquid ground, powder five ounces of common resin, and put it into a bottle with a pint of the strongest spirits of wine. Shake it up several times during the day till the resin is dissolved, which will be in twenty-four hours, and then leave it another day for the impurities in the resin to settle to the bottom. This mixture will be much too strong for use. You must therefore have another bottle, and mix some of it up with more spirits of wine, in the proportion of one-third of the mixture to

two-thirds of spirits, though even this will be too strong, for it is obvious that the greater the proportion of resin the larger will be the granulations.

Almost all the resinous gums, when dissolved in spirits of wine, will make grounds more or less adapted for aquatinting, and though the common resin is one of the best that can be employed if properly managed, yet as some of the other gums granulate in a very different manner, we have given specimens in Plate V, of eight different kinds of ground, *viz.* —

1. Turpentine varnish dissolved in spirits of wine.
2. Burgundy pitch and resin equal quantities.
3. Burgundy pitch alone.
4. Common black resin alone.
5. Mastic and Burgundy pitch, equal quantities.
6. Mastic alone.
7. Frankincense alone.
8. Mastic and common resin, equal quantities.

These different specimens should be examined through a strong magnifying glass to distinguish their peculiarities. No. 1. Turpentine varnish is merely a variety of the resin ground; and this, and No. 3. Burgundy pitch, No. 4. Common resin, and No. 7. Frankincense, will be found the best. Some aquatint engravers prefer mixtures, but we have always found that the simple resins — Burgundy pitch, resin, and frankincense, are much better when used alone than any compound of them.

Before laying an aquatint ground, it is necessary to

provide a tin trough rather longer than your plate to receive the superfluous ground, with a spout at one end by which you can pour it back into an *empty* bottle, and never into the same you have taken it from, as it is certain, however clean the trough may be kept, to gather some dust or impurities, which must be allowed to settle before it can be again made use of.

As the beauty of an aquatint ground depends not only on the manner it is laid, but also on the degree of polish possessed by the plate, we cannot but recommend a long and vigorous oil rubbing; first with washed flour of emery and oil, then with oil alone. The plate should next be wiped clean from the oil, then washed with spirits of turpentine, which must be wiped off with a rag, and afterwards the plate must be well rubbed with a clean dry rag and whiting. To know when a plate is perfectly clean, breathe gently upon it, and your breath will dim every part with a white mist or cloud, except such places as have any dirt or grease, which will remain bright. When any such spots appear, the plate should be oil rubbed again and cleaned as before.

When the plate is clean, hold it slanting on your left hand with the edge resting in the trough, pour over it the aquatint ground, and when the superfluous fluid has run off, lay it in the same slanting direction with the lower edge a little way off the table, and keep it well wiped. If, when dry, the ground is too fine, clean it off and lay another; but instead of pouring it once over, move

the plate in your hand in such a way that the ground may flow backwards and forwards two or three times before you allow it to run into the trough: by this means a greater quantity will remain on the plate, and the grain will be coarser. When on laying it once over only, the grain is too coarse, more spirits of wine must be added to the ground, but it is better that it should be so weak as to allow of its being allowed to run at least twice over.

Those only can be considered *good grounds* in which every grain is of the same size, for where they are of different sizes the smaller particles of resin are destroyed by the acid before the plate is half bit in. A badly polished plate is certain to make a *smudgy* grain as it is called, and it is the culpable negligence of aquatint engravers which has given to aquatint plates the unfortunate reputation of not being able to throw off many impressions. We have seen in Paris the five hundredth impression of one of the plates of Ostewald's "*Voyage Pittoresque en Sicile*," engraved with a very fine grain, in which even the most delicate tints had not become more weak, and have no doubt but that two thousand good impressions might be taken off. The copper was double hammered, and when polished had a peculiar silvery appearance.

It now remains to speak of the various accidents which may happen in laying an aquatint ground. The first and worst is *watering*, as it is called, and which consists in



the formation of drops of water on the ground as it begins to granulate, and which has the effect of making it much coarser under each drop than it is in the surrounding parts, so that when bit in, what ought to be a flat tint, has the dappled appearance of the feather of the guinea-fowl, being speckled with white. In England this always happens through want of strength in the spirits of wine, remembering that the same ground which waters on a very wet day will frequently make a perfect ground in dry weather. In Paris, however, we have found that the strongest spirits of wine will frequently water, and to those who have to practise the art of engraving in aquatinta in France, the following method of obviating its ill effects will be found of the greatest use. Lay your ground, set it to drain, and as soon as the grains are *completely* formed on the *lowest* part of the plate, take it on your left hand and dash over it a large basin full of cold water in such a manner that every part of the plate is immediately covered; set it to drain, and when dry the ground will be its natural colour in some places and white in others, which however will not prevent its biting even.

The accidents accruing from dust may be obviated in a great measure by placing the plate, as soon as the ground is laid, under a board sufficiently large to cover it, and supported at each end by books, &c.

If, as often happens when a ground is laid in very hot weather during the heat of the day, or in a cold room when there is a severe frost, it will not granulate, the only

remedy is to lay the ground very early in the morning in hot weather, and if possible in a room looking towards the north or north-west; in short, the best time for laying grounds is in very dry weather with a moderate temperature, excess of heat, cold, or humidity, being against a good formation of the grain.

It often happens that an outline of the subject to be engraved is etched on the plate before the aquatint ground is laid, and occasions considerable difficulty, as the ground settling in the etching causes a *white line* to be formed by the side of every dark etched line, producing an effect extremely disagreeable. This may be obviated by getting the printer to fill up the etching with ink, which must be left twenty-four hours to harden, when the plate may be cleaned as before directed, and the ground laid over it. This method has the advantage of preventing the etching from being bit in too deep by the aquafortis used in biting in the aquatint.

A ground having been obtained, the margin of the plate should be varnished over or *stopped out*, as it is technically termed, with a mixture of lamp-black, or oxyde of bismuth and turpentine varnish, leaving a narrow slip on the lower margin; and if the sky is a gradation, a small piece at the end where the sky is darkest. The use of the slip is to see the degree of strength each application of the acid has given to the plate, as will be explained hereafter. We must here recommend oxyde of bismuth in preference to lamp-black, as resisting the aquafortis

better; at the same time it is more cleanly, though a mixture of the oxyde with sufficient lamp-black to make it of a grey middle tint has peculiar properties, which makes it give a sharper line over grounds deeply bit in, than either of the substances used separately: these properties are of the greatest utility in working architecture, more especially where there is no etched outline.

The best palette for mixing the oxyde with varnish, is a marble slab with a deep hollow at one corner to hold spirits of turpentine; a small glass muller is required to mix them intimately by grinding them on the slab, and a thin palette knife to scrape the colour together.

Brushes of four different sizes, as represented in Plate I, fig. 15, will be wanted, the three smaller being red sables, which are best on account of their stiffness, and the larger one a flat camel's hair brush, for the margin or any other broad tints of varnish; and we must be allowed again to press on the young aquatinter's memory the necessity of having the oxyde of bismuth in a perfectly impalpable state.

When the margin is quite dry, the subject to be aquatinted must be transferred to the plate, either by tracing or drawing with a pencil. If the former method be preferred, the tracing must be carefully fastened down to the copper by bits of wax along the upper edge. A piece of thin paper, covered on one side with lamp-black and sweet oil, is placed between the tracing and the ground with the coloured side downwards, and every

line of the subject must be passed over with the tracing point, using a moderate pressure. One of the greatest difficulties is the preparation of the coloured paper, for if too much oil be used, every touch of the tracing-point *stops out*, and of course makes a white line when the plate is bit in; if, on the contrary, there is too little oil, the lamp-black does not adhere sufficiently to the ground, and is washed off after the first or second bites.

When the subject is drawn on the plate, a BB pencil is to be used, with which every part may be sketched on the ground with nearly the same facility as on paper, and where there is no painting or drawing to engrave from, this method is to be preferred. The greatest care must be taken that there be no grit or sand in the pencil, as it would scratch the ground and make a black line when bit in; for this reason a hard lithographic chalk is to be preferred, though there is great danger, as it is a greasy material, of *stopping out* if the pressure be too great.

The tracing being finished and the papers removed, a wall of a moderate height (that is, three quarters of an inch) must be put round the plate, with a large spout, which if the sky is a gradation should be at that corner where it is the darkest.

Every thing is now ready for stopping out, and in describing the method of engraving an aquatint plate, we shall follow the process used in the subjoined specimen, Plate VI, and trust we shall be able, by leading our readers

step by step through all its intricacies, to make them clearly understand this difficult art.

To five parts of water in a wide-mouthed bottle with a glass stopper, add one part of strong nitrous acid, and set it by till the heat occasioned by the mixture is entirely gone off.

Grind up together on your marble slab a little oxyde of bismuth and turpentine varnish, diluting it with spirits of turpentine till of a proper consistence to work freely. With a small sharp-pointed red sable stop out every part of the plate which is to be quite white, as the streaks in the sky, water, and roof, the white part of the chimney, house, and wall, the man's white night-cap, the checkers on the woman's dress, the white on the tilt of the first boat, and a few leaves on the tree behind the man and woman; in a few minutes the varnish will be sufficiently dry. We have already observed that the spout is at that corner of the plate opposite the darkest part of the sky, which is behind the chimney.

Hold the plate with your left hand in a sloping position, with the spout off the table, and lower than the other parts of the plate, which must rest on the edge of the table. Pour the aquafortis you have prepared very slowly on the lower part of the plate, in such a manner that it shall gradually rise till it first reaches the darkest part of the sky behind the chimney, and so goes on gradually, forming nearly a diagonal line across the plate, the direction of which will be that of a

line drawn from the opposite corner of the sky to the bottom of the window. In this manner proceed, gently raising your left hand, and adding more aquafortis till it has covered the white streaks in the sky; then raise your left hand suddenly that the acid may flow immediately all over the plate, and again sink it (holding the mouth of your bottle under the spout) so as to pour off the aquafortis as quickly as possible. Cover the plate with water, and wash off with a feather *all* the bubbles which the effervescence of the acid has left on the plate. Throw away this water and rinse the plate twice, wipe it dry with a clean soft towel, being exceedingly careful not to press so hard as to remove any of the stopping out.

In warm weather, or a very warm room, two minutes will be quite enough for the acid to have remained on the plate; but to know the exact time required for each bite is one of the greatest difficulties in aquatinta engraving, and can only be acquired by long experience. The aquafortis, which at eight o'clock in the morning in winter, before a fire has had sufficient time to warm the room, requires six minutes to procure a certain tint, will, in the evening, after candles are lighted, bite in the same in two minutes, so that no rule can be given. The best method of judging is to sweep away the bubbles which form on the surface whilst the acid is on the plate, and the rapidity with which they are renewed will be the best criterion of the energy of its action on the copper.

The darker part of the sky and roof will have now been

bitten two minutes, whilst the water over which the acid was only allowed to pass for a moment will scarcely have had more than fifteen seconds. The acid must be again poured on the plate in the same way, and for the same time, then washed off and dried, and the operation repeated a third time. This will have given six minutes to the upper part of the sky, and ONE MINUTE for the lower part of the plate which will be sufficient for the FIRST BITE.

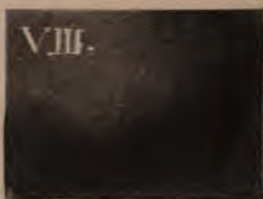
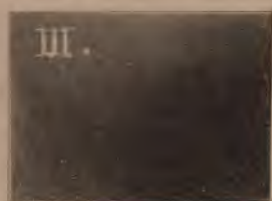
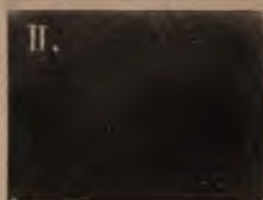
To see the degree of strength on the plate, first clean off with spirits of turpentine and rag the small piece of ground left uncovered on the margin at the end, and having wiped it quite dry, and freed it from every particle of varnish, take a little dry oxyde of bismuth on the tip of your finger and rub it well in, then with another finger, previously covered with whiting, polish it off, and you will see by the quantity of oxyde remaining in the part bit in the exact strength of the dark part of the sky. Pursue the same process with one end of the slip, and you will also see the strength you have obtained by this first process.

Stop out the parts you have uncovered on the margin, drawing the varnish in a straight even line across the slip where it had been opened for trial. The sky perhaps is now of sufficient strength, and to stop it out so as to preserve the forms of the trees, a new process must be resorted to.

Mix together equal quantities of whiting, sugar, and







*Aquatint Grounds*





gamboge with water sufficient to bring it to the consistence of cream, adding enough lamp-black to make it of a dark colour. With this composition paint in the roof, chimney, edges of all the trees, the man in the boat, the boat itself, stems of the trees, in short every part which comes against the sky. Then with the flat camel's hair brush, dipped in turpentine varnish and lamp-black diluted with spirits of turpentine, pass evenly over every part of the sky, taking care not to leave more on one place than another. Allow it to dry for one hour. Then cover the plate with water, and in another hour or less every part you have painted in with the composition will come up, leaving the ground ready for a fresh bite with the acid, whilst the turpentine varnish and lamp-black will, effectually stop out every part uncovered by the composition. Wash the plate clean with water and wipe it dry.

Stop out the light tree behind the figures, the woodwork at the bottom of the house, and every part which is sufficiently strong, and proceed to your SECOND BITE, for which the acid must remain on one minute and a half.

It is needless to follow the process through the whole working off of the first ground, which in the present engraving was done in eight bites, as may be seen by inspecting the slip. The time used for each was as follows :

|                 |                         |
|-----------------|-------------------------|
| 1st bite .....  | 1 minute.               |
| 2d ditto .....  | $1\frac{1}{2}$ minute.  |
| 3d ditto .....  | $2\frac{1}{2}$ minutes. |
| 4th ditto ..... | 4 minutes.              |

|                 |             |
|-----------------|-------------|
| 5th bite .....  | 6 minutes.  |
| 6th ditto ..... | 8 minutes.  |
| 7th ditto ..... | 11 minutes. |
| 8th ditto ..... | 15 minutes. |

And the whole plate was done with the same acid, but in general practice we recommend a small portion of strong aquafortis to be added each bite, by which less time is required, and the work shows out sharper. Aquafortis which has already been used, and is impregnated with copper should never serve a second time, as the work done with it will appear dull, and the grain dingy and indistinct, instead of that silvery clearness which forms the peculiar charm of the best aquatint engravings. The reader no doubt now understands that engraving in aquatint is like making an Indian ink drawing: each time the aquafortis is put on the plate a fresh tint is produced, and as each part successively becomes dark enough, it is stopped out. In this manner a plate is often finished with one ground bitten about twelve times, though in the present instance we preferred to leave the dark touches in the trees, boat, and window for a second grain, whilst the posts and ducks are etched in at the last.

To clean the plate, warm the back with a piece of burning paper, and the wall will easily come off. Scrape off what wax remains sticking to the plate with the palette knife. Clean off the varnish with spirits of turpentine and rag. Oil-rub the plate well, wash it clean with

spirits of turpentine, and send it to the printer's for a proof.

When the plate comes back oil-rub it thoroughly. Wash it several times with spirits, rubbing it dry each time with a clean rag, and lastly, polish it off with a soft clean dry rag with a very little whiting, and it will then be ready for a second ground.

Every second ground ought to be a rebiting ground on those parts you intend to work upon, and we must here inform our readers that rebiting grounds are those in which the resin granulates in exactly the same form as the one already bitten in. To do this, the spirits of wine must contain more resin and be laid fuller, for which reason a rebiting ground can never be obtained all over the plate, as when it rebites on the dark parts it will be coarser on the very light parts, and when a rebite on the light parts it will be finer, or as it is termed, a cut grain, on the darks. A strong magnifying glass is useful to examine peculiarities of the ground. Varnish the margin as before, but do not leave any slip: lay in all the dark parts of the trees, boats, and window with the composition; when dry, varnish evenly as before directed, put a wall round your plate, and in an hour's time pour on the water: let it remain till all the composition comes up.

The best and least tedious method of biting in dark touches, is by applying very strong aquafortis with a brush or feather, hence technically termed *feathering*. Mix the

strong nitrous acid with water in equal parts, have ready a basin of water and sponge, and then apply the acid by means of a feather, or what is better, a common camel's hair brush. No rule can be given for the time of biting in, and there is the greatest danger in leaving the aquafortis on too long, as the ground might thereby be entirely destroyed, and the plate ruined. The acid corrodes the copper downwards and *sideways*, and so gradually undermines the grains of resin till they give way, and the part becomes one even hollow incapable of holding the printing ink, instead of a succession of small holes. The dark touches being all bit in, there only remain to be finished the posts and ducks, which are done by etching through a thin coat of turpentine varnish to which a little white has been added. This method of laying in fine lines will be found very convenient in doing the rigging of ships, the lines in architecture, &c.

When any part of the plate is too dark it must be made lighter by means of burnishing, and this operation may be performed in two ways, either with oil and lamp-black, or dry, with very fine white-lead or oxyde of bismuth. In the former method the part to be burnished is filled in with oil and a little lamp-black : a shade of tissue paper is then placed between the plate and the light, in order to allow the different tints to be more distinctly seen, and the burnisher is then rubbed with a firm even pressure till the part is sufficiently light. In this method, though

generally used by almost every engraver, there is the greatest difficulty in distinguishing two tints which are nearly the same strength, and it is only long practice which will enable any one to burnish a delicate tint without reducing the strength of the edge of the one next to it, and so make a white line.

In the second method, the plate is made perfectly clean, and then filled in with the finest white-lead in powder or oxyde of bismuth; the former, however, for general purposes is best, when it can be had sufficiently fine, as the oxyde has a certain greasiness, which makes it clog the plate; for fine, and very delicate tints however, the bismuth will be found more useful, as you can observe the difference between two tints however slight, which no white-lead is capable of showing.

As a plate becomes worn by printing, all the fainter tints are effaced, so that care should be taken that the first bite is sufficiently strong to allow for it: for even should it be a little too strong, if all the other tints are in proportion by printing with a slacker press, or by adding a little white to the ink, it may easily be brought down to a proper standard.

Whenever one part of a plate is generally too dark, instead of burnishing, the quickest way is to rub it down with the oil-rubber, and washed flour of emery, or a piece of flannel stretched over the finger in place of the oil-rubber: if this is not found sufficiently expeditious, the paper prepared with washed flour of emery, after it



has been first rubbed on a piece of copper to take off the roughness and prevent its scratching, will reduce even the coarsest grounds very rapidly.

There are few who have not seen and admired the lithographic drawings by Harding and others, which have been published within the last three years, and which by employing a second stone to give the broad flat tints and high lights, imitate in the most perfect manner *pencil* sketches on coloured paper with the lights laid in with white chalk or paint.

In the same manner sepia or Indian ink sketches on coloured paper, may be equally well imitated in aquatinta, with this advantage, that as with the second stone only about six different degrees of strength of colour are obtained, with the second plate as many as twelve can be produced, if the colour in which it is printed is not too light.

We shall conclude our account of aquatinta engraving, by strongly advising every one who wishes to excel in this art, to practise *feathering* and the use of the acid with the brush as much as possible, not only for dark touches, but for all those parts where a gradation of tint is required, as clouds, mountains, &c., especially if dark, as a plate may be executed in this way with half the number of bites, and look much richer than when worked in the ordinary way.





MEZZOTINT.

## MEZZOTINTO.

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MEZZOTINTO engraving was most probably invented by Ludwig von Siegen, a lieutenant colonel in the service of the Landgrave of Hesse, as there is a portrait by him of Amelia Elizabetha, Princess of Hesse, dated 1643. He is said to have communicated his invention to Prince Rupert, to whom the honour of it has been frequently, but unjustly ascribed.

The process of mezzotint engraving consists in passing over a plate of steel or copper with an instrument called a cradle, by which a *burr* is raised on every part of the surface in such quantity, that if filled in with ink and printed, the impression would be one mass of the deepest black. On the plate so prepared the lights and middle tints are burnished or scraped away, leaving it untouched for the darkest shades.

The instruments used in mezzotinto engraving consist of burnisher, Plate I, figs. 3 and 4; scrapers, figs. 2 and 7; roulettes of different kinds, figs. 9 and 11; shading tools, fig. 10; and a cradle, or rocking tool, which is the same shape as the shading tool, and is used in laying grounds. The use of the roulette, fig. 11, is to darken any part which may have been scraped away too much,

and ought to be of different sizes. Roulettes of the form of fig. 9 are used for making dotted lines.

Formerly it was the custom to finish plates entirely in mezzotint, and most beautiful engravings have been produced in this style. At present, however, the outline of the subject is almost always laid in with a strong bold etching, somewhat resembling chalk engraving, and this serves to destroy that excessive softness which was formerly so much complained of. Indeed, so general has the practice of introducing lines and dots to express the different kinds of texture in objects become, that no plate is ever executed at the present day in *pure mezzotint alone*.

When the outline is etched, the *ground* must be laid, an operation which is performed in the following manner: — the plate is divided equally by lines parallel to each other, and traced out with very soft chalk. The distance of these lines should be about one-third of the face of the cradle which is to be used, and these lines should be marked with capital letters or strokes of the chalk. The cradle is then to be placed exactly betwixt the two first lines, and passed forwards in the same direction with them, rocking it from side to side, and proceeding till every part of the plate between the lines is covered with a burr. The same operation must be repeated with respect to all the other lines, till the instrument has passed over every part of the plate, care being taken to press steadily and firmly upon the tool.

Other lines must be drawn then from the other

two sides in the same manner, which intersecting the first at right angles will form them into squares. The same operation must be repeated with the cradle between each row of lines as before. New lines must then be drawn diagonally, and the cradle passed between them; and when the first diagonal operation is performed, the lines must be crossed at right angles, and the cradle passed between them in the same manner. The plate having undergone the action of the cradle according to the disposition of the first order of lines, a second set must be formed, having the same distances from each other as the first; but they must be so placed as to divide those already made into spaces one-third less than their whole width; that is, every one after the first on each side will take in one-third of that before; for instance, beginning at A, of which the first third must be left out, the third of B will consequently be taken in, and so of the rest. These lines of the second order must be marked with small letters or lesser strokes, in order to distinguish them from the first; and the same treatment of the plate must be pursued with respect to them as was practised with the others. When this second operation is finished, a third order of lines must be drawn, the first of which, for instance in A, must omit two-thirds of it, and consequently take in two-thirds of B, &c. By these means the original spaces will be exactly divided into equal thirds, and the cradle must be again employed between these lines as before. When the whole of this operation is finished, it is called *one*

*turn*; but in order to produce a very dark and uniform ground the plate must undergo the repetition of all these several operations, until a ground has been produced that will print a perfectly black tint.

When the subject is traced on to the plate, the work is commenced by scraping and then burnishing the highest lights, after which the next lightest parts are scraped away, and so on, proceeding gradually from light to dark, leaving for the deepest shades the ground untouched.

We have already spoken of etching in the outline, which we must here remark is a very delicate operation, for if too strong, it will appear spotty and dirty in the light parts, and if too feeble, it will be entirely lost when the ground is laid. It is therefore more advantageous to do nothing, before the ground is laid, but the mere outline, and then when the burnishing and scraping is nearly finished, to cover the plate with a thick coat of transparent etching-ground. On this lines are etched to give texture to the different parts, and of course ought to be varied as in line engraving, according to the nature of the object represented, making use of clean cut lines for polished surfaces, irregular broken lines for earth, &c.; in short, whatever may best express the texture of the substance upon which they are placed. This depends in a great measure on the natural taste of the engraver; but the best method for the learner, is to observe the works of the best engravers, not only in mezzotint, but also in line; more particularly good

etchings, by which he will see how any object may be best represented. Wood engravings will also be useful.

Almost every engraver has his own style of working, and it is extremely difficult to say where such and such lines ought to be used. Many artists use a great number of different kinds of roulettes for more readily etching in the dotted straight lines on walls, &c. Some again rely on the needle and graver, as for instance some of the French engravers, but a judicious employment of every kind of work will be found the best, taking care not to destroy by an over-anxiousness to procure texture, the peculiar properties of mezzotint, where its softness and velvet-like appearance are best suited to the object.

The great deficiency of mezzotint, when applied to landscape, is seen when a clear sky or light foliage is represented. However well the former may have been executed, it will ever have a misty appearance when compared with the clear, silvery, and brilliant tints of aquatint or line engraving; and we are sorry that the difficulty of procuring an *even* grain on steel, has hitherto prevented the union of two styles so peculiarly adapted to each other as mezzotint and aquatint. Might not something be done by covering steel with an excessively thin plate of copper, which is easily polished, and on which aquatint ground forms so well?

Light foliage coming away from a dark background is seldom well represented in mezzotint, which is too soft and undefined for the crisp and sparkling isolated



lights which are continually occurring in the leaves of trees. Here again aquatint would be of the greatest assistance, and this is felt not only in England, but in France, in which country the author has been continually asked to lend his assistance; but which has been rendered unavailing on account of the difficulty above mentioned.

In all the works on engraving which we have consulted, and in which mezzotint is mentioned, we find an account of printing this style of engraving in colours by means of different plates, as invented by Le Blon of Frankfort, a pupil of Carlo Marata. Printing in colours however is not peculiar to mezzotint, but may be applied to every style of engraving, as may be seen in Baxter's oil colour printing from wood blocks, and Hullmandel's lithographic printing in colours. But it is our firm conviction that wherever a number of plates are required to print the same subject, the expense will always be found, when compared with the result, much greater than the present process of having *one plate* printed in perhaps two colours, and finished by the print-colourer.

In Plate VII we have given a specimen of mezzotint, in which the subject is represented first in a finished state, and underneath with only a few general tints scraped out.





After the "Gemma" 1793, 1794

Printed by J. Johnson & Co. London

J. Johnson del.

*Stipple or Chalc.*





## CHALK AND STIPPLE ENGRAVING.

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WE have preferred to treat on these styles of engraving under the same head, as the process in each is so much alike, that they scarcely ought to have a different name.

The invention of chalk engraving has been attributed to three different French artists : G. E. Demarteau, J. J. François, and Louis Bonnet, all of whom lived in the first half of the eighteenth century.

Stipple engraving is said to have been invented by Bylaert, a painter and engraver of Leyden, although dotting is to be seen in the works of Albert Durer, and almost all the earliest engravers. It was introduced into England by the unfortunate Ryland, and brought to perfection by Bartolozzi, since whose time it has been used with great success in portrait, being particularly well adapted for the representation of flesh, and we should say for that alone.

The process of stipple engraving is very simple. An etching-ground being laid on the plate, and the subject transferred to it as in etching, the outline is laid in

by means of small dots made with the needle, after which all the darker parts are etched likewise in dots, which ought to be larger and laid closer together for the deep shades. The work is then bitten in, taking care not to let the aquafortis remain too long on the middle tints. When the ground is taken off the plate, all the lighter parts are laid in with the dry-point or stipple graver, Plate I, fig. 12, the form of which resembles the common kind, except that the blade bends down instead of up, thereby allowing greater facility in forming the small dots or holes in the copper. When a stipple graver is not to be had, a common graver will do exceedingly well, if its position in the handle be changed, so that the bend which was downwards is now uppermost: in using it of course it must be held with the bend downwards, the usual position of the handle in the hand being changed. We have already said that all the lighter parts must be laid in with the dry-point or graver, which gives much greater delicacy than can be obtained with the aquafortis: the middle tints also, which have been but faintly bitten in, must be worked up with the graver, which will make them softer, and the dark shades strengthened wherever they may want it, though should these be much too faint they are better deepened by laying a rebiting ground, as explained in etching. As every stroke of the dry-point or graver raises a burr on the plate, it ought to be scraped off occasionally, and the work recommenced till sufficiently

dark. When using the graver, the plate ought to be placed on a sand bag, or a button fastened to the back with wax.

Chalk engraving is merely the imitation of chalk drawings by means of stipple engraving, and like the latter is a very easy style. The grain which the chalk leaves on the paper is imitated by irregular dots of varied forms and sizes, and the whole process is exactly the same as stipple engraving.

Chalk engraving since the invention of lithography is much less practised than before, and we trust that the use of chalk as a material for sketching even the human figure, is gradually giving way to the superiority of its rival, the blacklead pencil. There is *nothing* that chalk can execute that cannot be done *better* and *quicker* with a BB blacklead pencil, to say nothing of the dirt and trouble in forming a point to chalk, and the difficulty of fixing the drawing when done.



## WOOD ENGRAVING.

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THE greatest uncertainty exists as to the exact time when wood engraving was first invented, or rather applied to the production of pictorial representations. Long before 1423, the earliest date yet found on any wood-cut, wooden stamps, having figures in relief, were used to impress on paper and parchment the signatures and marks of kings, nobles, the clergy, merchants, and others; and there is no doubt that at a very early period the illuminators of manuscripts often made use of a stamp to form their ornamented capital letters, and they may therefore claim in some measure the credit of inventing wood engraving, though Mr. Jackson in his splendid work on this division of the art attributes the discovery to the German card makers, who used wooden stamps to form the outline of their figures, which were afterwards coloured by means of stencilling.

The limits of our work will not allow us to pursue any further the history of wood engraving, to tell how it rose to eminence in the time of Albert Durer; how it gradually declined during the seventeenth century; or how, towards the end of the eighteenth, the rare talents of Thomas Bewick restored it to its former excellence. For these

details we must again refer the reader to "a Treatise on Wood Engraving," by John Jackson, a work which ought to have a place in every library, and which no wood engraver who has any love for his profession should be without. The process of wood engraving is exactly the reverse of engraving on steel or copper, in which the portions of the print required to be left white remain untouched, while the black and tinted parts are produced by a series of lines cut out of the metal with the graver; whereas in wood the black and tinted portions are left even with the surface, and the white parts are cut out. Whilst the engraver on steel produces his effect by a series of incised lines, the wood engraver cuts away only that part not intended to print.

In printing wood blocks it is necessary that the ink used should be of a composition much thicker than that employed in the production of prints from engravings on copper or steel, in order that it may lie *upon* the surface of the block without filling up the hollows. The manner in which type is printed is so well known, that it is only necessary to say that the printing of wood blocks is exactly similar, and generally done at the same time, as they are chiefly used in the illustration of books.

There are three kinds of wood used in this style of engraving; Sycamore, Pear, and Box, the two former being only used for large coarse cuts, such as are often seen at the head of play bills, as they are too soft to admit of fine lines being engraved upon them.

Box wood is grown in England, and though not so large as that imported from America or the Levant, is equally good or perhaps better, as being more rarely of a red colour, which is a certain sign of softness and of course unfitness for fine work, for which the smallest logs should always be chosen, those blocks which are of a clear yellow colour *all over* being the best. This however is very difficult to obtain, as almost always the centre of the tree is of a deeper yellow than the outside, which is in general whitish and much softer.

Box is purchased in small trunks varying from four to twelve or fourteen inches in diameter, and from two to five feet in length; they are cut into slices of about seven-eighths of an inch in thickness, the same as that of type in order that the engraving may be printed simultaneously with the letter-press. These slices after being cut from the trunk are laid by for a period varying according to circumstances, from twelve months to two years, to ensure their being properly seasoned.

To prepare a block for drawing, nothing more is requisite than to cover the smooth surface with a thin coating of Bath brick finely powdered, and mixed with a little water, which when dry is to be removed by rubbing it off with the palm of the hand. This gives a certain degree of roughness which makes the blacklead pencil mark more freely on the block. Drawings on wood are executed in two different styles. One in which the principal flat tints are *laid in* in Indian ink, and then

touched up with a blacklead pencil, as was done in the drawing of which the annexed cut is a representation.



The other in which every line is drawn exactly as it is intended to be produced in the engraving. The annexed cut is a specimen of the facsimile style as it is called, and which is much easier, and requires less skill in the engraver to execute than the former.

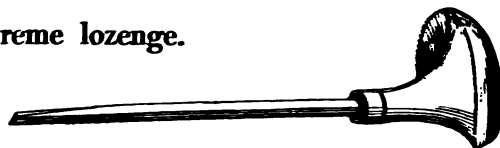


The tools used by wood engravers, are gravers, tint tools, scoopers or gouges, chisels or flat tools, and a mezzotint scraper (see fig. 7, Plate I) for scraping away the wood in the

process of lowering. The gravers are the same as those used in line engraving, and vary in form from the square lozenge



to the extreme lozenge.



Six or eight will generally be found sufficient.

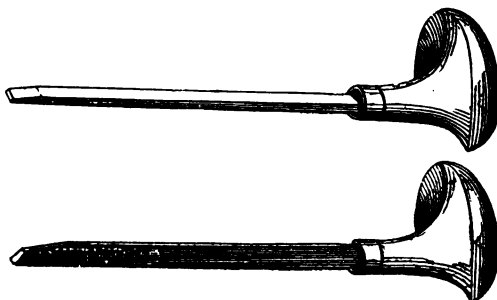
Tint tools are deeper in the sides than gravers, and



are used where a succession of fine parallel lines are wanted. Six will be found sufficient, those for the broadest lines being about as fine as the most lozenge graver, the five others growing gradually finer.

Scoopers (plate I, fig. 6) are chiefly used for scooping out the wood from the middle parts of the block, and ought to be of six different sizes.

Flat tools, chisels, or as they are sometimes called blocking out tools, are used for cutting away those



parts of the block which are towards the sides after the engraving is finished.

When the drawing is finished, before the engraver begins to work upon it, the block ought to be covered all over with hot-pressed Bath post, except that part where he intends to begin. It is then placed on a sand bag, which being higher in the centre, allows the block to be turned with more facility, and thereby gives greater freedom of execution.

We have already said that the facsimile style is much the easiest kind of engraving. In this style less judgment and artistical power are required, as every line is here drawn for the engraver, and all that is required of him is sufficient mechanical practice to enable him clearly to cut out those parts which have been left white by the artist, and leave standing up, sharp, and clear every line in the drawing. Thus in the facsimile style, the print of a wood engraving is little more than an exact representation in ink of the drawing of the artist.

In all those parts of the drawing which are meant to be extremely soft and light, the surface of the block should be lowered before the engraver begins to work upon it. As of course this operation, which is done with a mezzotint scraper, entirely effaces those parts of the design on which it is performed, and which the engraver must either draw in again himself or take it back to the artist, it is much better that only an outline be made at first, and the parts to be lowered indicated with tints

of white colour. The wood engraver proceeds to lower the block in the necessary places, and then gives it back to the draughtsman who finishes his drawing. By these means there is less danger of the drawing being injured during the process, but at the same time it requires that the artist should perfectly understand the principle of lowering.

It is in those designs which are made on the block with Indian ink, that the mechanical skill and artistical powers of the engraver are fully shown. Left almost entirely to himself, the choice of the kind of work with which he proposes to make out the different parts of the drawing, depends more on his knowledge as a draughtsman than his skill in handling the graver: for instance, let an Indian ink drawing of a fox be given to two engravers, one of whom shall be eminent for the cleverness with which he can manage his tools, and the other very deficient in this respect, but at the same time more used to the drawing of animals, the latter shall produce an engraving, which however roughly executed will have that resemblance to nature, for the want of which no skill or beauty of execution on the part of the former can compensate. We have been led to these observations by having lately seen a work on animals, where the subjects badly drawn are no doubt made worse by the want of artistical knowledge displayed by the engraver in his *elaborate* and *careful* execution of them.

As in line engraving, so in engraving on wood, we can

give no rules for the use of such or such lines for expressing certain objects: it is true we can say that straight parallel lines are best for indicating blue sky, and waving lines for clouds, but that is about all we can say. We cannot tell with what lines the engraver should make out the light leaves of the willow, or the stiff foliage of the yew; the long grass of the meadow left unmown till autumn, or the clean cut lawn where not one blade rises higher than another. These, and almost every other object, each engraver will represent after his own manner, and that manner is best which approaches nearest to nature. We repeat, the best method for the engraver is to practise drawing from nature in *blacklead*, or *pen and ink*, those objects, which it is his intention to make the subject of his profession, whether it be landscape, figures, architecture, or animals.

When the engraving is finished, a proof is obtained in the following manner. With a small silk dabber dipt in printing ink, the whole surface of the block is evenly covered by dabbing it with a light steady hand, and not too much ink, so as not to force it *between* the lines. A piece of India paper is next laid on the block with a card over it to prevent the fine lines from being injured by the pressure. A burnisher is then rubbed firmly all over, by which an impression of the work is taken off on to the India paper.

When an injury has happened to any part of the work, the only remedy is to introduce a fresh piece of wood:



for this purpose a circular hole is drilled nearly through the block, sufficiently large to cut out the part to be obliterated; a plug of box is then driven in, and the part re-engraved.

One of the greatest advantages which wood engraving possesses over all other kinds, is the facility with which the same block may be multiplied by means of stereotyping. This is done in two ways. The first is by taking a mould of the block in plaster of Paris, from which a cast is made in type metal, and this, if the operation has been carefully performed, will be very little inferior to the block itself. The second method is by impressing the surface of the block in melted metal, sufficiently liquid to receive the impression: from this mould a cast is taken, but this method, notwithstanding the metal cools immediately the block is placed upon it, is very dangerous, as the finer lines of the wood engraving are extremely liable to become charred, though the whole surface of the wood be previously rubbed with soap\*.

Of late years many attempts have been made to engrave on metal blocks in the same way as on wood, but as none of them are so *good* or *cheap* as wood engraving, they have never been encouraged by the public, and it will be needless for us to describe the different processes by which they have been performed. We shall however

\* We have no doubt that in a very short time stereotyping woodcuts will be entirely superseded by the voltaic process.—See ELECTROGRAPHY.

· speak of Mr. C. Hancock's method, which is quite different from all others, and which Mr. Jackson thus explains: "The principal feature in Mr. C. Hancock's patent metallic relief engraving, which is quite original, is, that subjects resembling mezzotints can be inserted and printed with the text in the same manner as wood engravings. A mezzotint plate, if printed in the usual manner previous to being engraved upon, would appear black. On the other hand, if submitted to the same kind of printing as a wood-cut, it would scarcely discolour the paper. Upon this plate Mr. Hancock draws his subject with a broad steel point or burnisher, which polishes down the small prominences to a smooth surface in proportion to the pressure used in drawing. In proportion as the surface becomes smooth, so does it print more dark, and have the appearance of a mezzotint. The reader will perceive that, according to this plan, Mr. Hancock can take a proof of his subject at any time, and procure either light or dark at pleasure, as the subject may appear to require it. The sparkling light can be touched in with the graver in the same manner as on wood; so that such touches appear much sharper than in common mezzotint, where the lights are got by burnishing. As Mr. Hancock has not as yet brought any thing before the public, it would be unfair to anticipate him by introducing any thing more in this place than a description of his process."

In engraving on wood by lamplight, a most excellent method is to place between the work and the lamp a glass

globe filled with clear water, in such a manner that the concentrated rays of light may fall upon the block. This has the advantage of giving a much more brilliant light than the lamp itself, and at the same time much cooler, as the lamp is at a greater distance. It is also much more economical, as a single lamp will serve several persons each having a globe. We have seen in France four persons working very comfortably with one candle in the midst of them; but in England we do not study economy so much, nor is it so well understood as amongst the nations of the continent. We remember also to have seen in France a letter engraver make use of clear blue water, or rather weak aquafortis strongly impregnated with copper, in his globe, the light through which, he said, was much more agreeable, clear water being too dazzling.

Chiaoscuro drawings are easily imitated on wood by printing over the impression of the finished engraving a second block with the high lights cut out: this, if printed in grey ink, will give the appearance of a pen and ink drawing done on grey paper, with the high light touched in with white colour; and by using several blocks with different colours Mr. Baxter has been enabled to produce beautifully finished impressions in oil colours, as may be seen in the Pictorial Album of 1837.





— View in W. Walden.



— View by N. Walden.

*Lithography, (Two Printings).*  
*Printed by C. Hulmandel.*





## LITHOGRAPHY.

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LITHOGRAPHY is the art of drawing or writing on stone, though many restrict the signification of the term to the mere printing or taking impressions from such drawings or writings. We shall, however, take it in the former sense, for though we propose to briefly explain the process of lithographic printing, it is that part which is executed by the artist which properly belongs to this treatise.

The process of lithography depends on the facility with which some kinds of stone absorb either grease or water, and on the natural antipathy which grease and water have for each other. An even surface having been given to the stone, a drawing is made upon it with a greasy chalk. The stone is then wet, and the printer passes over it a roller covered with printing ink, which adheres to those parts only which are drawn upon with the chalk; a damp paper is then pressed upon it, and receives an impression of the drawing.

Lithography was accidentally discovered about the year 1792 by Alois Senefelder, the son of a performer at the Theatre Royal of Munich. He was a student of



obtained a patent at Munich, and entered into partnership with a Mr. André Senefelder to establish presses and establishments in London, Paris, and Vienna. He was assisted, with a brother of Mr. Offenbach, in the new art, then called polytechnic lithography, by some of our best English artists, who suffered continual failures through want of skill to appreciate the difference between German and English lithography, which caused it to be abandoned.

After his separation from Mr. André, Senefelder went to England, where he tried to apply lithography to the printing of maps, but apparently without success, and returned to Munich in 1806, in which year the Bavarian government drawing at the public school at Munich, he succeeded in multiplying copies of his drawings for his pupils by lithography. He is also said to have invented the composition for chalk as now made.

In 1809 we find Senefelder inspector of the royal lithographic establishment at Munich, and engaged in drawing a map of Bavaria, and soon after invented the process of lithography, which, however, did not succeed: it was not until 1823 at London, by a partner of Senefelder, that the inability to crack by being wet and the pressure of the stone, rendered it useless.

It was done in England after 1806, till its revival in 1823, since which time it has been gradually improving, till lately it has acquired still greater powers

law at the university of Ingoldstadt, and after his father's death tried a theatrical life, but without success. He then became an author, but being too poor to publish his work, tried various methods of writing on copper in order that he might print them himself, and soon found that a composition of soap, wax, and lamp-black formed an excellent material for writing, capable, when dry, of resisting aquafortis. To obtain facility in writing backwards, as copper was too expensive, he procured some pieces of calcareous stone, which when polished served him to practise upon. His mother having one day desired him to take an account of some linen she was sending to be washed, he wrote it out on a piece of this stone with his composition of soap and wax. It afterwards occurred to him, that by corroding the surface with acid the letters would stand out in relief, and admit of impressions being taken from them. He tried the experiment and succeeded, and soon found that it was not absolutely necessary to lower the surface of the stone, but that simply wetting it was sufficient to prevent the printing ink from adhering to any parts except those which were marked with the composition.

Such was the invention of lithography, and Senefelder continued to pay unremitting attention to the improvement of the art. In 1796 pieces of music were printed, and it was perhaps the first time that lithography became of real use. The difficulty of writing backwards brought about the invention of the transfer paper.



In 1799 Senefelder took out a patent at Munich, and soon after entered into partnership with a Mr. André of Offenbach, who proposed to establish presses and take out patents in London, Paris, and Vienna. He came to London in 1801, with a brother of Mr. Offenbach, and communicated the new art, then called *polyautography*, to many of our best English artists, who tried it; but the continual failures through want of skill in the printing, and the difference between German and English materials, caused it to be abandoned.

Having separated from Mr. André, Senefelder went to Vienna, where he tried to apply lithography to the printing of cottons, but apparently without success, and he returned to Munich in 1806, in which year the professor of drawing at the public school at Munich, Mr. Mitterer, succeeded in multiplying copies of his drawings for his pupils by lithography. He is also said to have invented the composition for chalk as now made.

In 1809 we find Senefelder inspector of the royal lithographic establishment at Munich, and engaged in printing a map of Bavaria, and soon after invented the stone paper, which, however, did not succeed: it was exhibited in 1823 at London, by a partner of Senefelder, but its liability to crack by being wet and the pressure of the press, rendered it useless.

Little was done in England after 1806, till its revival in 1817, since which time it has been gradually improving, till lately it has acquired still greater powers

by the means of employing a second stone, by which is obtained a perfect imitation of drawings made on tinted paper, having the lights laid on with white.

In France, also, it was not till the year 1815 that any thing can be said to have been done in lithography, when Count Lasteyrie took it up.

The stones used in lithography are calcareous, and readily absorb grease and moisture, and effervesce with an acid. The best are from Bavaria, though those of Chateauroux, in France, would perhaps be found still better were they not so full of spots of a softer nature; for it is highly necessary that a stone should possess the same degree of hardness throughout its entire surface. In England, stones have been found at Corston, near Bath, which though of a coarser grain than the German stone is sufficiently good for writing or transfers.

Stones are prepared for chalk drawings by rubbing two together, with a little silver sand and water between them, taking care to sift it to prevent any large grains from getting in, by which the surface would be scratched. The upper stone is moved in small circles over the under one till the surface of each is sufficiently even, when they are washed, and common yellow sand is substituted for the silver sand, by which means is procured a finer grain. They are then again washed clean and wiped dry. We must remark that the upper stone is always finer of a finer grain than the under one.

same process is used. After being rubbed with the brown sand, it is washed off, and powdered pumice stone used instead: the stones are afterwards washed, and each polished separately with a fine piece of pumice stone, or water Ayr-stone. Chalk can never be used on the stones prepared in this manner.

Exactly the same process is followed in order to clean a stone that has already been used.

Lithographic ink is composed of

|                       |                         |
|-----------------------|-------------------------|
| Tallow . . . . .      | 2 ounces.               |
| Virgin wax . . . . .  | 2 ounces.               |
| Shell lac . . . . .   | 2 ounces.               |
| Common soap . . . . . | 2 ounces.               |
| Lamp-black . . . . .  | $\frac{1}{4}$ an ounce. |

“ These materials are prepared in an iron saucepan with a cover. The wax and tallow are first put in and heated till they ignite; whilst they are burning the soap must be thrown in in small pieces one at a time, taking care that the first is melted before a second is put in. When all the soap is melted, the ingredients are allowed to continue burning till they are reduced one-third in volume. The shell lac is now added, and as soon as it is melted the flame must be extinguished. It is often necessary in the course of the operation to extinguish the flame and take the saucepan from the fire, to prevent the contents from boiling over; but if after the process above described any parts are not completely melted, they

must be dissolved over the fire without being again ignited.

The black is now to be added, having previously mixed it with thick varnish, made by heating linseed oil till it will ignite from the flame of a piece of lighted paper, and allowing it to burn till reduced to one half. When it is completely dissolved, the whole mass should be poured out on a marble slab, and a heavy weight laid upon it to render its texture fine."

The utmost care and experience are required in the making both of the ink and chalk, and even those who have had the greatest practice often fail. Sometimes it is not sufficiently burned, and when mixed with water appears slimy; it must then be remelted and burned a little more. Sometimes it is too much burned, by which the greasy particles are more or less destroyed: in this case it must be remelted and a little more soap and wax added. This ink is for writing or pen drawing on the stone. The ink for transfers should have a little more wax in it.

Lithographic chalk is made of

|                       |                            |
|-----------------------|----------------------------|
| Common soap . . . . . | 1 $\frac{1}{4}$ ounce.     |
| Tallow . . . . .      | 2 ounces.                  |
| Virgin wax . . . . .  | 2 $\frac{1}{4}$ ounces.    |
| Shell lac . . . . .   | 1 ounce.                   |
| Lamp-black . . . . .  | $\frac{1}{4}$ of an ounce. |

The manner of mixing the ingredients is exactly the same as in preparing the lithographic ink.

Transfer paper is made as follows—

Dissolve in water half an ounce of gum tragacanth. Strain it, and add one ounce of glue and half an ounce of gamboge. Then take of

French chalk . . . . . 4 ounces.

Old plaster of Paris . . . .  $\frac{1}{2}$  an ounce.

Starch . . . . . 1 ounce.

Powder and sift them through a fine sieve; grind them with the gum tragacanth, glue, and gamboge: then add sufficient water to give it the consistence of oil, and apply it with a brush to thin sized paper.

The drawing or writing being made on the prepared side of this paper, is transferred to the polished stone (which must be warmed to about 125° Fahrenheit) by being wet at the back and placed with the face downward on the surface. The stone is then passed four or five times under the press, and the paper being damped is taken off, when the writing will be found transferred from the paper on to the stone. This process is extremely useful for maps and plans, &c., where expedition and economy are required.

The subject intended to be drawn ought to be traced on to the stone in red, as the lines will more readily be distinguished from those of the lithographic chalk, and in this operation, as well as all others, the greatest care must be taken not to lay the fingers on any part of the stone intended to be worked upon, as the insensible perspiration

of the hand will be sufficient to print. If in speaking, also, the smallest speck of saliva should fall upon the stone, it will prevent the chalk from adhering to it, and make a white spot.

The subject may also be *drawn* on the stone with a soft black-lead pencil, but we do not recommend it, as the similarity of colour occasions frequent mistakes as to which is chalk or which is black-lead, so that parts where the pencil has been are frequently left untouched by the chalk through this mistake.

When the tracing is made, a bridge is placed over the stone to prevent the hand from touching it, and the work is commenced exactly in the same way as in making a drawing with a BBB black-lead pencil on smooth paper, with this difference, that lithographic drawing requires a greater degree of firmness to make each stroke tell; for if sufficient strength be not employed to make the chalk adhere firmly to the stone, it will come off in places in the preparation, and spoil the whole. The execution of the details, when nothing but lines are wanted, is extremely simple, but when a flat tint is required considerable practice is necessary to lay it even, and it is only to be done by continually working in different directions a great many times with faint strokes. This operation is so extremely tedious, that many artists who are in the habit of working on stone employ an assistant to do all the flat tints.

Whenever a light is wanted, it may either be left or scraped out with a scraper: the last method is best when-



ever a thin white line is wanted, or such lights as the foam of the sea.

If any part is made too dark, the only remedy is to pick out the chalk with a very fine needle till it is reduced to the requisite strength.

When the drawing is finished, it is prepared for printing by *etching in*, which operation consists in pouring over it aquafortis, diluted in the proportion of one part acid to one hundred parts of water. The stone is placed in a sloping direction, and when the aquafortis has run over it, it is turned so that the acid may run back again, producing a slight effervescence: the drawing on the stone is then washed with water, and afterwards weak gum-water is poured over it. The use of the acid is to destroy the alkali in the lithographic chalk, making the stone refuse the printing ink except where touched by the chalk: the gum-water helps to fill up the pores, and thereby prevents the lines of the drawing from spreading. The proportion of acid in the water should always be a little stronger for drawings made with ink than those made with chalk.

When the stone is not too wet, the roller charged with printing ink is passed over it, and the stone is ready for printing.

To etch on stone, a highly polished one, such as is used for writing on, is prepared by pouring over it the aquafortis as mentioned above, which is immediately washed off. As soon as dry, cover it with gum-water and lamp-black which must also dry, when it is ready to etch upon.

In etching, you make use of a needle as in etching on copper, with this difference, that you merely cut through the gum, the lines that are to be dark being obtained by a broader point, and not by pressing deeper into the stone: when the etching is finished, it is rubbed all over with linseed oil, and the gum washed off with water. Let it be remembered that the line in this style of work looks much thicker than it will print.

Woodcuts may be imitated on stone by covering with ink those parts which are meant to be black, as in middle tint, and then scratching out the lights with an etching needle, whilst those lines which come against a white back ground are best laid in with a very fine brush and lithographic ink.

Very beautiful effects are produced in lithography by employing a second stone, and thus pencil sketches on coloured paper touched up with white, are imitated in the most perfect manner. The method is as follows—

|                    |          |
|--------------------|----------|
| Take wax . . . . . | 2 parts. |
| soap . . . . .     | 1 part.  |

And a little vermilion to colour it. Melt it in a saucepan, and cast it into sticks. Rub this composition with water till it is as thick as cream, and then cover with it a polished stone such as is used for writing upon. An impression of the first stone is applied to the stone so prepared, and the parts intended to be white are then taken out entirely with the scraper, whilst those intended for half tints are scraped somewhat less, so that by this method

half a dozen tints are obtained. The manner of printing is, first to take an impression of the second or tint stone in any colour the artist may think will best suit his subject; on this impression the first stone is printed in black, the greatest care being taken by marks in the first stone that the two impressions fit exactly, otherwise the effect will be entirely spoiled.

Another method is, after an impression has been taken from the first stone to the second, to cover the bright lights, which are to be left white, with thick gum-water and a little vermilion. The whole is then covered by rubbing a stick of the composition all over it very thick; after which the superfluous composition is scraped off with the straight edge of a piece of ivory or horn, and what remains well rubbed in with a piece of the finest woollen cloth stretched over the end of an oil-rubber which has never been used. In performing this operation, a fresh place in the cloth should be laid over the end of the oil-rubber after each stroke, which should be carried the whole length of the stone, and the greatest care taken to leave on, or rather rub in, to the stone the same quantity of composition on every part, so as if printed it would give one even tint all over the impression.

The next thing is to procure the different degrees of middle tint, which is to be obtained in two different ways. First, where a defined edge is not wanted the composition is to be rubbed off with the woollen cloth, and this method is extremely useful for clouds, and to soften the hard edges

of the positive whites which have been laid in with gum. In this way also the gradation of evening skies are executed.

In the second method all the middle tints, which have a defined edge, must be scraped up very carefully, otherwise they will be uneven. The scraper may also be advantageously used to soften the positive lights.

When only one tint with the edges of the lights not softened is required, the quickest method is to lay in the white touches with gum, as before directed, on the tint stone, after the impression of the first stone is transferred to the stone intended to print the coloured tint, and then send it to the printer, who by passing the roller two or three times over it will give it a tint, which, if necessary, may be softened at the edges of the white places, or have fresh lights taken out afterwards with the scraper.

Drawings are now made on zinc plates: the operation is then called zincography; and the most beautiful work, quite equal to lithography, is produced by it, as may be seen in the specimen from the crayon of Mr. Haghe which we have subjoined. At the same time the great portability of zinc plates, when compared with the ponderous stones required for large drawings in lithography would always cause them to be preferred, were it not for the circumstance that nothing that is once done can be effaced and again retouched, nor can we take out the lights, which on zinc plates ought always to be left.

These difficulties render zincography only fit to be prac-





PL. 10.



By Charles W. Hayward

A. MEANING ON LUNC.

1. The first part of the document is a list of names and addresses of the members of the committee.





tised by an artist certain of his work and of what he intends to do : in such hands it has this great advantage, that the faintest line, which in lithography would perhaps be effaced in the etching in, is certain to print.

Although, throughout this work, we have purposely abstained from entering into those details which belong exclusively to the printer, still we think we ought not to omit the following extracts from the Magazine of Science.

If the drawing should run smutty the following mixture for cleaning the drawing, while printing, must be used : Take equal parts of water, spirits of turpentine, and oil of olives, and shake them well together in a glass phial until the mixture froths ; wet the stone, and throw this froth upon it, and rub it with a soft sponge. The printing ink will be dissolved, and the whole drawing will also disappear, though, on a close examination, it can be distinguished in faint white lines. On rolling it again with printing ink the drawing will gradually reappear as clear as at first.

Accidents sometimes occur in the printing from the quality of the paper. If the paper have been made from rags which have been bleached with oxymuriatic acid, the drawing will be incurably spoiled after thirty impressions. Chinese paper has sometimes a strong taste of alum ; this is so fatal as sometimes to spoil the drawing after the first impression.

When the stone is to be laid by after printing, in order

that it may be used again at a future period the drawing should be rolled in with a *preserving ink*, as the printing inks when dry would become so hard, that the drawings would not take the ink freely. The following is the composition of the preserving ink—Two parts of thick varnish of linseed oil, four parts of tallow, one part of Venetian turpentine, and one part of wax. These must be melted together; then, four parts of lamp black very carefully and gradually mixed with it, and it must be preserved for use in a close tin box.

## MEDALLIC ENGRAVING.

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THERE are few who have not of late years seen and admired the beautiful facsimiles of medals in the *Tresor de Numismatique*, produced by the process of M. Achille Collas, or those equally beautiful and more correct of Mr. Bate. These facsimiles are executed by machines, the relative merits of which a few years ago became the subject of investigation before a Committee of the House of Commons, and the result was so completely in favour of Mr. Bate, that we trust the Editors of the *Tresor de Numismatique* have long since laid aside their imperfect instrument, with which however they have produced such beautiful but unfortunately incorrect engravings. So perfectly indeed is the imitation of relief given in this style of engraving, that nothing but the touch can convince the uninitiated that the *engraving itself* is not in relief.

The machines of M. Collas and Mr. Bate, as well as those of Mr. Asa Spencer (an American), Mr. W. Froude, and Mr. Saxton, are merely improvements of an apparatus described at least thirty years ago, if not more, in a French work called the *Manuel de Tourneur*; for, however de-

fective the apparatus therein described may be, it is still the original idea or invention.

The following is a description of this apparatus, and will serve to give the reader an idea of the principle on which all the improved machines have been constructed. "The medal, and the copper on which the medal is to be engraved, are fixed on two sliding plates, at right angles to each other, and so connected, that when the plate on which the medal is fixed is raised vertically by a screw, the side holding the copper plate is advanced by an equal quantity in the horizontal direction. The medal is fixed on the vertical slide, with its face towards the copper plate, and a little above it. A bar, terminating at one end in a tracing point, and at the other in a short arm at right angles with the bar, and holding a diamond point, is placed horizontally above the copper, so that the tracing point shall touch the medal to which the bar is perpendicular, and the diamond point shall touch the copper plate to which the arm is perpendicular. Under this arrangement, the bar being supposed to move parallel to itself, and consequently to the copper, if the tracing point pass over a flat part of the medal, the diamond point will draw a straight line of equal length upon the copper; but if the tracing point pass over any projecting part of the medal, the deviation from the straight line by the diamond point will be exactly equal to the elevation of the corresponding point of the medal above the rest of the surface. Thus by the transit of this tracing point over any line upon the medal, the

diamond will draw upon the copper a section of the medal through that line. A screw is attached to the apparatus, so that if the medal be raised a very small quantity by the screw, the copper plate will be advanced by the same quantity, and thus a new line of section may be drawn. By continuing this process, the series of sectional lines upon the copper produce the representation of the medal on a plane, the outline and the form of the figure arising from the sinuosities of the lines, and from their greater or less proximity.

Engravings produced by this method possessed this material defect, that they were always more or less distorted ; that is to say, the copy always varied considerably from the degree of exactness, which would have been obtained by a perpendicular projection of each point of the medal upon a plane *parallel to itself*. The position of the more prominent parts was more altered than that of the less elevated ; and the greater the relief of the medal, the more distorted was the engraved copy.

Such is the principle on which the different machines have been constructed, but so modified as no longer to produce the errors above-mentioned, and we have before us a beautiful specimen of this kind of engraving, executed by the machine of Mr. Bate, in which the representation is perfect.

## ELECTROGRAPHY.

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THIS newly discovered art has been hitherto commonly called electrotpe, but we prefer giving the name chosen for it by the inventor, Mr. Spencer, of Liverpool.

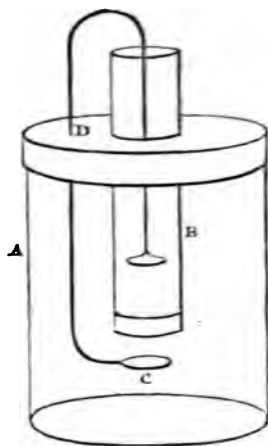
The benefits which this gentleman by his wonderful discovery has conferred on arts and sciences in general, and on the Fine Arts in particular, are incalculable. It is already in great use among the calico printers, as well as other branches of manufactures, in which engravings on copper are employed. Engravings on wood can be multiplied *ad infinitum* as readily as those on copper. Plaster, wooden, or clay models can also be reproduced with as much facility as medals, coins, or copper plates. Highly finished designs may be deposited on plates for the purpose of printing embossed cards with extraordinary facility, and the fidelity with which the process of electrography reproduces the works subjected to its operations, can be designated only by the statement that they are *perfect*.

The faintest lines, or even blemish in the polish of the original plate, is preserved, and so completely is this done, that it has been found desirable to take copies of *blank plates*, that is, highly polished plates without work on them, in order to obviate the uncertainty of the polishers' art, and also as a saving of expense; and we have been informed that these reproduced plates are preferred by the engravers.

In aquatint it is so requisite to have a very highly polished surface, that the success of all the after operations are almost entirely dependant on it, and for this purpose it must be invaluable. Mr. Hughes, coppersmith of Shoe Lane, is at present successfully pursuing this branch of Electrography, and we believe that Mr. Palmer, of Newgate Street, has been the most fortunate operator in London, in reproducing facsimiles of medals, engraved copper plates, even steel, &c., and we feel assured that the specimens he has produced will fully bear out what we have above stated. With him it has been a favourite pursuit, and he has much pleasure in showing and explaining its extraordinary powers.

We must now proceed to give a short account of the apparatus, selecting Mr. Spencer's description of that which he uses for copying a small copper plate or coin, nor can we do better than give it in his own words.

"The first kind of apparatus used by me to copy plates on copper or coins, is shown in the accompanying figure



in which A, represents a glass or tumbler containing the copper solution. B, a gas-glass, having one end closed with brown paper or plaster of Paris, and containing the saline solution. C, the plate or medal required to be deposited on, having a wire attached, to the other end of which is a piece of zinc, the wire being bent into the requisite form. D, a wooden cover, into which the gas-glass fits. Should one of those glasses be used that has a projecting rim, it may then be very readily suspended from the top, care being taken that it is about an inch or more from the bottom of the exterior vessel. This apparatus is adapted for experiments on a small scale, or to take a facsimile of a single medal.

The coin or plate is best fastened to the wire by means of Newton's fusible metal, which melts in boiling water, and is composed of three parts of tin, five of lead, and eight of bismuth. The zinc should be the same size as



the coin or plate which is to be deposited on, and the wire should be bent in such a manner that the zinc may be immediately over the coin. The zinc plate should also be of the same *thickness* as the required thickness of the deposit. It is *better* that the side of the zinc which is not exposed to the copper be varnished, and it must *always* be done to the coin or plate to be deposited on, or otherwise a deposition will be *found* on the back and edges of the plate.

“To close the end of the gas glass I formerly used plaster of Paris; I now find that a very thick sort of brown paper answers very well. It is fastened on to the glass by giving the edge a coat of cement with a small brush; the glass must be slightly heated, and while in that state the disc of brown paper may be fastened to it, which performs the same functions as the plaster, and has the additional advantage of very materially quickening the process. The outside vessel must now be nearly filled with a saturated solution of sulphate of copper, and it is advisable *to have a quantity of the crystals of that salt always undissolved in the fluid.*

“The gas glass containing the zinc must also be nearly filled with water, in which a few crystals of sulphate of soda have been previously dissolved. The sulphate of soda is put in merely to excite action in the first instance, it not being afterwards necessary to add any portion of this salt, sufficient action being kept up by the sulphuric acid set free in the other cell, which passing into this

combines with the oxide of zinc to form a sulphate of zinc, which may be afterwards removed and used for commercial purposes provided the operation be performed on a large scale.

“After a few days a certain thickness of copper will be deposited on the coin, and this deposition will be an *exact impression* of it, which impression being used as a mould, and subjected to the same operation, will produce a *perfect facsimile* of the side of the coin which was first deposited on.”

Instead however of this double process, which of course requires double time, Mr. Spencer having found that copper was deposited on lead as rapidly as on copper, placed the coin on a piece of lead planed smooth with a carpenter's plane, and subjecting both to considerable pressure in a screw-press obtained a perfect impression, which served as a matrice to deposit copper upon by the above process. In this manner he also obtained perfect impressions from *wood blocks* without injuring the engraving in the slightest degree, although a very great pressure was used.

To produce an impression by means of electrography from an object of plaster, wood, clay, earthenware, or any other non-metallic substance, the surface must be metallized in the following manner. “Suppose it to be an engraved wooden block which you are desirous of metallizing, in order that copper may be deposited on its surface—this example holding good for any other material. The first operation is to take strong alcohol, or spirits of turpentine, in a glass

vessel, and add to it a piece of phosphorus (a common phial corked will answer the purpose); the vessel must now be placed in hot water for a few minutes and occasionally shaken. By this means the alcohol will take up about a three hundredth of its bulk of phosphorus, and we thus obtain a solution of phosphorus. Next procure a weak solution of nitrate of silver, place it in a flat dish or saucer; the engraved face of the block must now be dipped in this solution, and let remain for a few seconds to allow capillary action to draw the nitrate of silver into the wood.

“This operation being performed, a small portion of the solution of phosphorus must be poured into a capsule or watch glass, and this be placed on a sand-bath that it may gradually evaporate. The block must now be held with its surface over the vapour, and an immediate change takes place; the nitrate of silver becomes deoxidized, and gives place to metallic silver, which allows the voltaic deposit to go on with as much rapidity and certainty as the purest silver or copper.

“The whole process may be performed in a few minutes and with absolute certainty of success.”

To prevent the deposit from adhering to the mould, the latter should be covered with a mixture of bees-wax and turpentine, which must be rubbed off as much as possible, as enough is certain to remain on to prevent the adhesion.

The slower the deposit takes place the harder and

firmer it will be, and slowness may be obtained by stopping the end of the gas glass with a sufficient thickness of fine plaster of Paris: the thicker and finer the plaster the slower will be the deposit.

The above will give the reader a general idea of the process, which of course has to be a little varied to suit particular purposes; but as our limits will not allow us to enter more fully into the business, we must refer our readers to Mr. Spencer's pamphlet, published by Messrs. Tegg, Cheapside, London, in which they will find a very lucid explanation of every process, such as preparing the original plate, detaching the copy or deposited plate, the use of powerful voltaic batteries for the sake of expedition, &c., and many other things of equal interest.

# PHOTOGRAPHY.

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PHOTOGRAPHY, or photogenic drawing, is the art of producing the representation of objects by the action of light.

We may divide photography into three different kinds. First, that in which the representation is obtained on paper prepared with the nitrate or chloride of silver. Second, that in which it is produced on resins, bitumens, or the residua of essential oils. Third, that in which iodine is the receiving surface.

## FIRST METHOD.

Photogenic paper is prepared by saturating in a solution of common salt a sheet of paper, which is then dried, and one side (previously marked at the corner) covered by means of a large camel's hair brush with the solution of the nitrate of silver, after which it is hung in a *dark* room, and when nearly dry again washed as before with the nitrate. It is then hung in the same dark room till quite dry, and afterwards enveloped in several thicknesses of brown paper to keep it from the action of the light.

The proportions for the solutions are—

Ten grains of common salt to one ounce of distilled water.

Thirty grains of nitrate of silver to one ounce of distilled water.

In preparing photogenic paper the following cautions ought to be strictly observed—

Take care that none of the solution of the nitrate of silver falls on any substance, as it will make an indelible black stain, and it cannot even be removed from the hand until the skin peels off.

Be careful that the paper when used is perfectly dry, or there will be danger of its staining the object laid on it to copy. If quite dry it will not injure the most delicate piece of lace.

The vessels into which the solutions are poured must be glass or earthenware, and the brush must not be set in tin, nor must metal of any kind come in contact with them.

Take great care that none of the solution of salt falls into the solution of the nitrate of silver.

The paper should be prepared by candle-light, and the brush and vessels immediately washed in water.

To obtain the representation of plants, feathers, &c., on photogenic paper, place the object on the marked side with a piece of glass to keep it close, and set it in the light of the sun, which in a few minutes will change all the exposed parts to a deep brown or black, whilst the places which are covered by the plant will be perfectly white in

those parts where the object is quite opaque, and have a faint tint where it is semi-transparent.

Photogenic etching is done by covering a piece of glass with lamp-black and varnish several times till perfectly opaque, and when dry the subject is etched with a needle *through* the varnish; it is then placed with the varnished side downwards on a piece of photogenic paper, and exposed to the sun, when every scratch of the needle will print a black line on the paper.

Another method is to place a piece of glass over a sheet of black paper, and then with white-lead mixed with varnish, to paint in the subject so as to resemble an Indian ink drawing, leaving the glass bare for the black touches, and laying on the colour very thick for the bright lights, the middle tints being laid on thinner in proportion as they are darker. When the whole is perfectly dry, lay it with the painted side downwards on a piece of photogenic paper, and place it in the sun, and the *proof* will resemble a mezzotint engraving.

To take views, place a piece of photogenic paper in the focus of a camera obscura, and set it opposite the object to be drawn, which ought to be well lighted by the sun. In about half an hour the image will be traced on the paper, but reversed, that is to say, the lights will have produced shades, and the shades lights. Remember it is impossible to take the image of trees blown by the wind, or any moving object.

To obtain the representation of microscopic objects,

place a piece of photogenic paper about eight or ten inches from the object glass of a solar microscope; in a short time any object placed in the instrument will be seen represented on the paper.

To copy an engraving, it ought to be varnished at the back to make it transparent, and then laid over a piece of photogenic paper with a glass to keep it down; when exposed to the sun every black line in the engraving will give a white line on the paper.

As in this method of photogenic drawing the representation is always the reverse of the object, to obtain a correct image the first representation obtained, *after it is fixed*, must be varnished to make it transparent, and placed over another piece of the photogenic paper. It is then set in the sun, and the second representation being the reverse of the first will of course be the same as the original.

To fix photogenic drawings, soak them for a minute or two in hot water, and then wash them in a solution of the hyposulphite of soda. We are however sorry to say, that neither this, nor any other method of fixing the images on the paper, hitherto discovered, is infallible.

#### SECOND METHOD.

*Discovered by Monsieur Niepce.*

All the various kinds of resins, bitumens, and residua of essential oils, are sensible to the action of light; but the best is the residuum of the essential oil of lavender, which



is obtained by evaporating with heat the essential oil in a saucer. A small quantity of the residuum is dissolved in spirits of wine, and poured over a piece of glass, or a plate of copper covered with silver, and made perfectly bright and clean. When it has drained off, the plate must be set to dry in the *dark*. As soon as it is perfectly dry, the plate or glass will be of a dull white, and may be immediately placed in the camera obscura opposite the object to be represented, an operation which will take from six to eight hours for a view, and three hours for a simple light-coloured object well illumined by the sun. When glass is used, a sheet of white paper should be placed at the back to increase the light.

When the plate has been sufficiently long in the camera, it must be taken out and fastened to a piece of board, which must be placed face downwards over a tin dish containing the oil of petroleum. The exhalation which takes place from the oil will render more or less transparent those parts least affected by the light, whilst the places where the light has been very strong will remain white and unchanged. The representation however will be very faint, as the brightest lights will not be a pure white, and the darkest shades not so dark as the natural colour of the residuum of the essence of lavender. The plate should be placed under glass to preserve it from the dust.

## THIRD METHOD.

*Called the Daguerreotype, and invented by Monsieur Daguerre.*

The images are taken on silver plated on to copper, and the process is divided into five operations.

## FIRST OPERATION.

This consists in cleaning the plate, and is done by first rubbing it with a piece of cotton wool dipped in salad oil and pumice stone ground to an impalpable powder, and then with dry cotton and the powder. It is next rubbed equally all over with a piece of cotton dipped into nitric acid diluted with water in the proportion of six parts of water to one of acid, and then lightly rubbed with cotton and the powder. The plate should now be exposed for five minutes to a strong heat, by holding it over a spirit-lamp, or a pan of burning charcoal, and then suddenly cooled by laying it on a marble slab or a stone.

After the plate has been heated and cooled, the acid ought to be applied three times, cleaning it after each time with cotton-wool and powder.

## SECOND OPERATION.

For this must be provided a box and a small board which fits into the top; four strips of copper silvered over, with holes in them, and small projecting pieces of metal soldered into them; some tacks, and a small bottle of iodine.

The plate is attached to the board by placing the strips of metal round it, and fastening them in such a manner with the tacks driven through the holes, that the little projections hold the plate firm. The board is then placed with the plate downwards into the top of the box, in the bottom of which a small quantity of iodine is placed in a saucer. The lid of the box is shut, and the plate left exposed to the fumes of the iodine till it has become of a beautiful gold colour, and no longer, for if it begins to turn violet it will not do, and the plate must be recommenced entirely.

#### THIRD OPERATION.

The third operation consists in placing the plate into the camera obscura, which should be done in a dark room by candle-light. The camera is then placed opposite the object to be represented, and according to the intensity of the light shining upon it, so will the operation be performed with greater or less rapidity, varying from three to thirty minutes.

#### FOURTH OPERATION.

The apparatus consists of a deep box, as broad as the board but not quite so long, so that when the board is placed inside with one end resting on a ledge half way down, the other end may lean against the opposite side at an angle of forty-five. The box stands on legs, and in the bottom is a round hole, into which a saucer is fitted con-

aining mercury. The bulb of a thermometer is buried in the quicksilver, and the stem passes outside of the box: a pane of glass is let into the side of the box opposite to that on which the ledge is placed, so that the plate may be seen from the outside. Every thing being arranged, a spirit-lamp is placed under the saucer till the thermometer marks  $60^{\circ}$  centigrade, when it must be withdrawn, and if the thermometer has risen very fast, it will continue to rise, but ought never to pass  $75^{\circ}$ .

The image of the object exists on the plate, but is invisible till brought out by the fumes of the mercury, as may be seen by looking through the pane of glass with a candle. When the image appears perfect, the plate must be taken out and submitted to the

#### FIFTH OPERATION.

Two tin dishes a little larger than the plate must be provided; one filled with hot water, and the other with a hot solution of the hyposulphite of pure soda. The plate is first placed in the dish of hot water, and then transferred to the solution of hyposulphite of soda, in which it may be agitated by lifting it up and down with a little crook made of copper wire tinned. When the yellow colour has disappeared, it must be taken out and fastened to a board placed in a sloping direction, and a kettle of distilled water very hot, but not boiling, poured on to it in such a manner that the water may pass over it in an even

stream. The plate may then be taken off the board and blown dry, the work being entirely finished, except that it ought to be placed under a glass to keep off the dust and prevent any vapours from tarnishing the silver.

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Such is a slight sketch of the different methods of photogenic drawing, which we have introduced into this work rather from a hope of what it *will do*, than what it has done; though at the same time we must certainly consider it as the most wonderful discovery that has ever taken place in the fine arts.

## A LIST OF REQUISITES FOR ENGRAVERS.

|                               | s. | d. | c. | d. |                              | s. | d. | c.      | d. |
|-------------------------------|----|----|----|----|------------------------------|----|----|---------|----|
| Callipers .....               | 4  | 0  | 10 | 0  | Restoring Wax .. per stick   | 1  | 0  | 0       | 0  |
| Barwickers .....              | 1  | 0  | 1  | 3  | Stakes and knives .. each    | 5  | 0  | 25      | 0  |
| Scrapers .....                | 1  | 0  | 2  | 0  | Hand-vices .. small          | 2  | 0  | 4       | 0  |
| Measuring-tape .....          | 0  | 5  | 0  | 3  | T Squares .....              | 1  | 0  | 12      | 0  |
| Measuring Raking Tools ..     | 1  | 0  | 40 | 0  | Eye-Glasses .....            | 1  | 3  | 4       | 0  |
| Shaving Tools .....           | 1  | 0  | 1  | 0  | Stands for dials .....       | 7  | 0  | 10      | 0  |
| Dividers .....                | 2  | 0  | 3  | 0  | Sand Bags .....              | 1  | 10 | 4       | 0  |
| Drawing & Tracing Points ..   | 0  | 5  | 0  | 10 | Debblers .....               | 1  | 0  | 1       | 0  |
| Diamond Tracers .....         | 21 | 0  | 0  | 0  | Tracing Paper, English.      |    |    |         |    |
| Gravers .....                 | 1  | 3  | 0  | 4  | French.                      |    |    |         |    |
| Needles .....                 | 0  | 12 | 0  | 0  | Copping Blocks.              |    |    |         |    |
| Drawing Awls .....            | 1  | 0  | 0  | 0  | Copper Plates .....          | 1  | 4  | upwards |    |
| Roulets .....                 | 2  | 0  | 2  | 0  | Steel Plates .....           | 2  | 4  | upwards |    |
| Parallel Rules .....          | 2  | 0  | 18 | 0  | Dimensions for Raising Ma-   |    |    |         |    |
| Steel Line Rules .....        | 2  | 3  | 5  | 0  | chines .....                 | 12 | 0  | 21      | 0  |
| Line Gages .....              | 3  | 0  | 10 | 0  | Lamps .....                  | 3  | 0  | 18      | 0  |
| Hammers .....                 | 1  | 0  | 2  | 0  | Lithograph Stone .. per inch | 0  | 5  | 1       | 0  |
| Polishing Ground .. per ball  | 1  | 0  | 0  | 0  | Scissors for dials .. each   | 3  | 0  | 0       | 0  |
| Stopping-out Varnish per bot. | 1  | 0  | 0  | 0  |                              |    |    |         |    |

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| Return from Hawking.       | Miss Eliza Peel.         |
| Maid of Saragossa.         | Campbell, the Poet.      |
| Sir John Patteson.         | Lady Harriot Clive.      |
| The Queen, (by Chalon).    | Right Hon. Lady Dover.   |
| The Queen receiving the    | Miss Peel.               |
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| Duke of Wellington as      | Countess Grey.           |
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| Robinson Crusoe, and | Wilkie).            |
| Man Friday.          | Hafed.              |

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| Royal Cortège, Windsor.  | Cordelia.                |
| Covenanters preaching.   | Death of a Stag.         |
| Contented Captive.       | Appointed Hour.          |
| Wellington at Waterloo.  | Amelia awaiting her Hus- |
| Royal Hunt.              | band.                    |
| Game Keeper's Stable.    | Bridemaid and Juliet.    |
| Down Charge.             | Parting Hour.            |
| Spanish Monks preaching. | Waterloo Heroes.         |
| The Daughter.            | Wellington at Waterloo.  |
| The Wife.                |                          |

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|                             |                         |
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| Forester in search of Game. | Keeper going his round. |
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| Coronation of Queen Vic- | The Queen in her Imperial |
| toria, (Hayter).         | Dalmatic Robes, (ditto).  |

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| Napoleon at Waterloo. | Independent Voter. |
| The Monopolist.       |                    |

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| Prince Albert, (G. Patten). | Baptism of Covenanters. |
| The Queen, (Sully).         | Battle of Drumclog.     |

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|-------------------------|--|
| Countess of Mornington. |  |
|-------------------------|--|

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| My Child! My Child!    | Search the Scriptures. |
| They're saved! They're | Juliet.                |
| saved!                 | Law and Catspaw.       |

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| The Betrothed.         | The Virgin.             |
| Covenanters preaching. | Reading the Scriptures. |

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| Earl of Wilton.         | Shipwreck.       |
| Earl of Mulgrave.       | Quiet Enjoyment. |
| Spanish Contrabandista. |                  |

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| Her Majesty, (Swandale).   | Seal of Affection.   |
| Hon. Mrs. Norton.          | First of April.      |
| Rice Wynne, Esq.           | St. Valentine's Day. |
| The Covenanters.           | Military Attack.     |
| Looking in, & Looking out. |                      |

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| Constable's Landscapes.   | Venice, (Harding).       |
| Vale of Dedham, (by do.)  | Return to Port.          |
| Banditti attacked, and    | Gates of Gaza.           |
| Confession.               | Cities of the Plain, &c. |
| Ld. Chief Justice Tindal. |                          |

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| Woman taken in Adultery.  | Wellington, (by Briggs,    |
| Promise.                  | R. A.)                     |
| White Mouse.              | Passage of the Red Sea.    |
| Cottage Piety.            | Opening of the Sixth Seal. |
| Wellington, (W. Simpson.) |                            |

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| Sleeping Blood-hound. | Children with Rabbits. |
| Odin.                 | Monkeyana.             |

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|                  |                |
|------------------|----------------|
| Sir Robert Peel. | Lady Harcourt. |
|------------------|----------------|

### EGAN.

|                             |                        |
|-----------------------------|------------------------|
| Wreckers.                   | Cranmer revoking.      |
| Shipwreck off St. Michael's | Citation of Wickliffe. |
| Mount.                      | The Inquisition.       |
| Guilt and Innocence.        | Village Church.        |
| Young Wife, and Young       | The Widower.           |
| Husband.                    | Disputed Fair.         |
| Shakespeare before Sir      | The Widow's Treasures. |
| T. Lucy.                    | Chatre's Cathedral.    |

### W. GILLER.

|                         |                            |
|-------------------------|----------------------------|
| Wolsey receiving Cardi- | Fighting for the Standard. |
| nal's Hat.              | Richard Cœur de Lion.      |
| Retreat at Naseby.      | Battle of Bosworth.        |
| Highland Bothie.        |                            |

### B. P. GIBBON.

|                           |                   |
|---------------------------|-------------------|
| Suspense.                 | Shepherd's Grave. |
| Shepherd's Chief Mourner. |                   |

### J. SCOTT.

|                             |                         |
|-----------------------------|-------------------------|
| Return of Prodigal Son.     | Last Moments of Charles |
| Wellington, (by J. Lilley). | the First.              |
| First of April.             | Rebecca borne off.      |

### S. W. REYNOLDS.

|                        |                           |
|------------------------|---------------------------|
| Wellington and Nelson, | Sunday.                   |
| (Army and Navy).       | Sale of Pet Lamb.         |
| Martyrs in Prison.     | Progress of Intemperance. |
| Jacob's Dream.         | Young Chief's First Ride. |

## MARTIN.

|                          |                   |
|--------------------------|-------------------|
| Marus Curtius.           | Concubine.        |
| Alexander and Diogenes.  | The Deluge.       |
| The Fall of Ninewah.     | Destroying Angel. |
| Joshua commanding the    | Fall of Babylon.  |
| Sun to stand still.      | Satan in Council. |
| Death of the First Born. | Pandemonium.      |
| Belshazzar's Feast.      |                   |

## LUTTON.

|                         |                        |
|-------------------------|------------------------|
| Beckles Disposing.      | John Ward, Esq.        |
| Marquis of Westminster. | Ancient Jerusalem.     |
| Lord Brougham.          | Smugglers Quarrelling. |
| Scene from Paul Pry.    | Waiting for the Times. |
| Earl of Egmont.         | Adieu to the Woods.    |

## W. CARLOS.

|                                  |                      |
|----------------------------------|----------------------|
| Broken Fisher.                   | Auld Robin Gray.     |
| The Courier.                     | John Anderson my Jo. |
| Fruits of Idleness and Industry. |                      |

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## LINE.

### BURNET.

|                              |                               |
|------------------------------|-------------------------------|
| Greenwich Pensioners.        | Burns in his Cottage.         |
| Chelsea Pensioners.          | Reading of a Will, (Stewart). |
| Dancing Dolls.               | Blind Fiddler.                |
| Escape of the Mouse.         | Young Bird.                   |
| Family saved from Shipwreck. | Christmas Eve.                |
| John Anderson my Jo.         | Playing at Draughts.          |
| Rabbit on the Wall.          | Valentine.                    |
| Letter of Introduction.      | Cotter's Saturday Night.      |
| Jew's Harp.                  | The Dispatch.                 |
| Mr W. Scott in his Study.    | Trial of Charles the First.   |

### B. P. GIBSON.

|                        |                                  |
|------------------------|----------------------------------|
| Jack in Office.        | Shepherd's Grave, and Companion. |
| Fire-side Party.       |                                  |
| Wolves attacking Deer. | Two Dogs.                        |

## DOO.

|                         |                                     |
|-------------------------|-------------------------------------|
| Girl with Flowers.      | Pilgrims in sight of the Holy City. |
| Fair Forester.          | Minna Troil.                        |
| Lady Celina Meade.      | Shylock and Jessica.                |
| Proffered Kiss.         | Nature.                             |
| The Messiah.            | Dutch Girl and English Girl.        |
| Preaching of John Knox. |                                     |
| Sterne and Grisette.    |                                     |

### F. ENGLEHART.

|                |              |
|----------------|--------------|
| Only Daughter. | Duncan Grey. |
|----------------|--------------|

### RAINEBACH.

|                       |                 |
|-----------------------|-----------------|
| Rent Day.             | Spanish Mother. |
| Distraining for Rent. | Errand Boy.     |
| Parish Beadle.        | Cut Finger.     |
| Blindman's Buff.      |                 |

### J. WILLMORE.

|                |                    |         |
|----------------|--------------------|---------|
| Byron's Dream. | Mercury and Argus. | Venice. |
|----------------|--------------------|---------|

## J. H. WARE.

|                  |                |
|------------------|----------------|
| Highland Dancer. | Finch of Farn. |
|------------------|----------------|

## W. H. WARE.

|               |           |                 |
|---------------|-----------|-----------------|
| Thomas Moore. | The Poet. | The Manuscript. |
|---------------|-----------|-----------------|

## W. FISHER.

Lord Byron and Napoleon.

## J. H. BENTON.

|                       |                         |
|-----------------------|-------------------------|
| Sir W. Scott, Lawyer. | Spanish Flower Girl.    |
| Wolf and Lamb.        | Little Red Riding Hood. |

Mantilla.

## GRAVE, A.R.A.

|                       |                        |
|-----------------------|------------------------|
| Enchanted.            | Musical Box.           |
| Mathematical Algebra. | Albion's Family.       |
| tion.                 | Highland Whisky Still. |

## LE KOCK.

Venice, (by Prout).

## SHENTON.

Stray Kitten.

## HARDEN.

|                        |                    |           |
|------------------------|--------------------|-----------|
| Mischief in Full Play. | Shooting Poney.    |           |
| Rat-catcher.           | Sportsmen at Home. | The Trac. |

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## STIPPLE.

### WOOLNUT.

|                   |                   |
|-------------------|-------------------|
| Queen, (Collins). | Story of my Life. |
|-------------------|-------------------|

### RYALL.

|                   |                                |
|-------------------|--------------------------------|
| Rose Bradwardine. | Prince Albert & Queen, (Ross). |
|-------------------|--------------------------------|

### NOTTE.

|                                       |
|---------------------------------------|
| Prince Albert, and Queen, (Drummond). |
|---------------------------------------|

### F. C. LEWIS.

|                     |                         |
|---------------------|-------------------------|
| Lovely Sisters.     | Wellington, (Lawrence). |
| Princess Charlotte. | La Sevilleana.          |

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## NUMISMATIQUE.

|  |              |
|--|--------------|
| BATES.—Great Seal of England.              |              |
| Gate of the Temple.                        |              |
| Canterbury Pilgrimage, (Collas).           | Last Supper. |
| Beautiful Gate of the Temple, (Freebairn). |              |
| Great Seal of England, (Freebairn).        |              |

## LITHOGRAPHY.

### LANE.

|                              |                           |
|------------------------------|---------------------------|
| Tagliani.                    | Prince Albert, and Queen. |
| Queen and Duchess of (Ross). |                           |
| Kent, (Chalon).              | Highland Shepherd's Dog.  |
| High and Low Life.           |                           |

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